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Side Line Tides Foundry Over Depression

Sporting Goods Castings Kept Foundry Going—Showed Considerable Increase in 1921—Application of Special Metal to New and Difficult Field

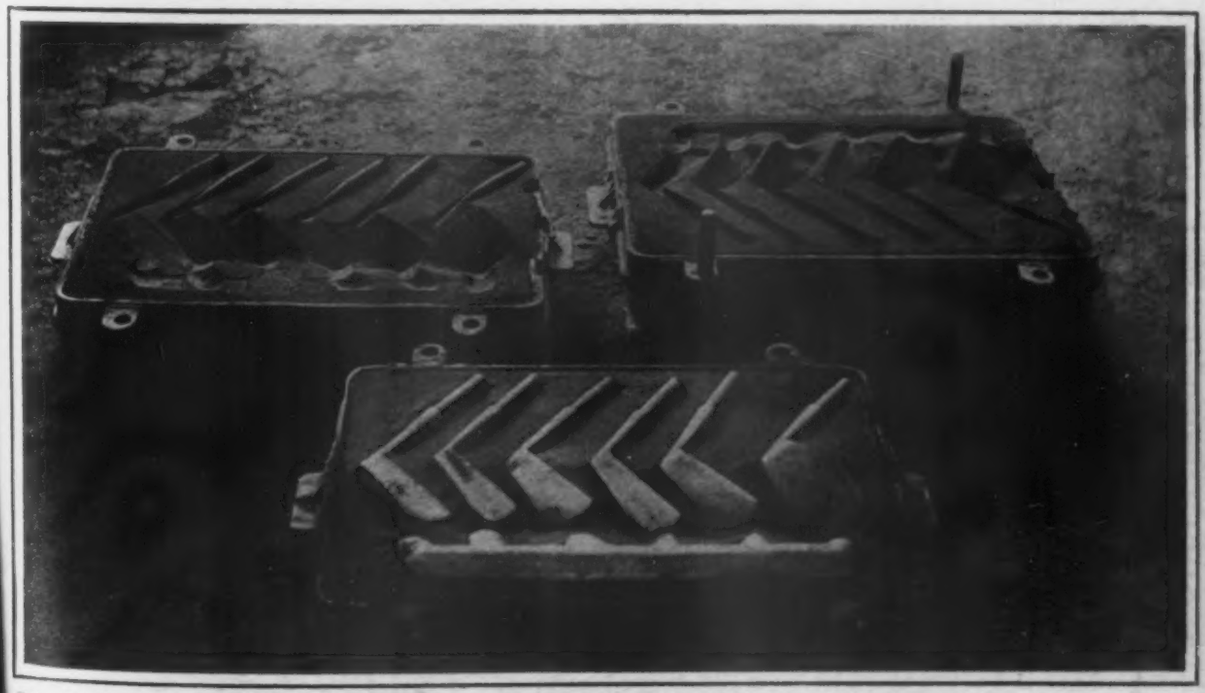
BY MORRIS A. HALL

IT has often been said in jest, "If your business interferes with your pleasure, give up the business." Yet there is a great deal of truth hidden in that supposedly humorous remark, for, no matter how poor business may be, the business man seldom gives up his pleasures or recreations, especially the out-of-doors ones which help conserve his health. One foundry has learned this in the last two years, and has continued to do a fine business in a small side line, which happened to be of a sporting nature, when all other business fell off or was canceled because of dull times.

This foundry is that of the Monel Metal Products Corporation, Bayonne, N. J., a subsidiary of the International Nickel Co., and the active agent for pushing the latter company's natural copper-nickel alloy. This metal is not an easy one to handle, and the plant is primarily a laboratory for the purpose of finding out all there is to know about the metal, its melting, molding, casting, and general handling and use, and is actively engaged in disseminating this information. Incidentally, in seeking new fields of use for the metal, the plant takes in a considerable amount of job foundry work in monel metal, and some in nickel.

In seeing new fields for the metal and more work for the foundry, golf club heads were tackled several years ago. It is a well-known fact that the advanced golfer is very particular about his clubs, especially his irons. In caring for these, however, it is found that they rust easily. This is probably due to the fact that, in use on the links, they become wet or damp, with no means of drying them until the club house is reached an hour or two later. When the iron has rusted, it can be cleaned up only by buffing, or grinding and buffing, according to how badly it has rusted. This process changes the size and shape, and with it the hang of the club, for no matter how minute the amount of metal taken off, several repetitions of this treatment make an appreciable difference.

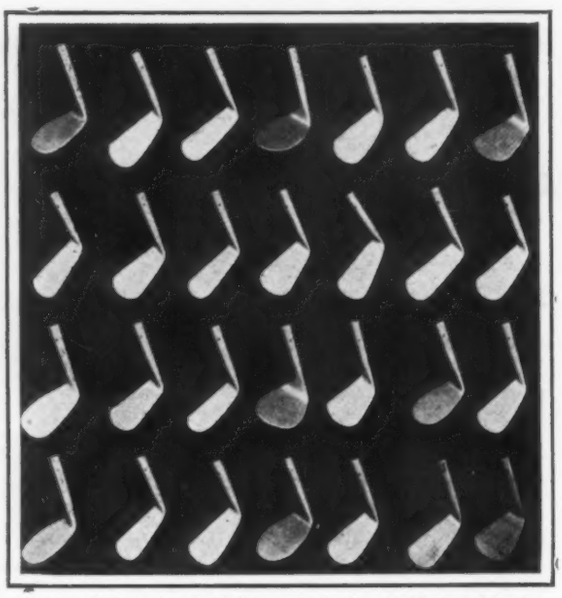
Monel metal is both rust- and acid-proof, consequently it fits well into this service. Moreover, it has a nice white color, not unlike silver, which gives it a good appearance. As it is hard, like steel, it wears well;



Cope and Drag Molds for a Group of Six Golf Club Heads; in the Foreground Is Another Drag Mold with the Pattern and the Gate Pattern in Place

as it is strong, it will withstand the hard knocks equally as well as steel heads. In addition, it is slightly more resilient than steel, so that the ball will leave a monel metal head "clean," and with just the right "feel."

If desired, it can be given a very high polish, and when polished, it will retain this beautiful surface sheen much longer than other metals. When given its normal dull finish, that of a razor or of a nickel piece



Group of Twenty-eight Representative Golf Club Heads Made in Monel Metal

after some use, it can quickly be restored by the use of soap and water, or by rubbing with sand.

The fact that it is a cast metal, and when cast has the properties of forged steel, makes it possible to duplicate any head or to copy the best imported forged heads from the leading Scotch cleek makers, without variation, quickly and, comparatively speaking, cheaply. Granting all these qualities, it was simply a matter of getting golfers to try the new metal, when it was at once established as satisfactory. Since that happened, several years ago, the plant has been making these heads in considerable quantities for a New Jersey firm, which finishes them up in final club form with handles, and markets them.

This business has grown slowly, but surely, and now has reached the point where it forms a considerable portion of the work done. Moreover, it has not dropped off during the recent dull times. In fact, some 35,000 of these heads were turned out in 1921, up to the middle of September, with the business continuing so strongly as to indicate the year's total at above 45,000. For 1922 the company expects to turn out about 60,000. In 1920 the number was very much less.

This could hardly be classified as "tonnage," for the heads average 0.6 lb. each. This makes a gate of six of them, with very large risers and wide gates, total less than 10 lb. One illustration gives an idea of the wide variety of the styles which are being made now; these 28 shapes, however, do not represent all that are made, as new shapes are constantly being added as demand develops for them. As has been said, the metal is not an easy one to handle, but so many of these golf heads have been turned out from the plant that valuable experience has been gained and they are now handled very readily, cheaply and quickly.

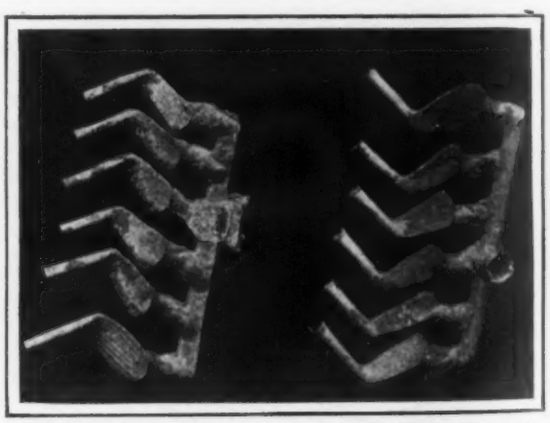
It has been found that this metal gives the best results only with baked molds, as well as baked cores; but in very small articles, weighing a pound or less, such as these golf heads, the molds are made in green sand. A complete mold is shown ready for closing; in the background at the right is the cope, at the left the drag, and in the foreground another mold with the patterns in place.

While cast as a gate, these patterns are individually not gated, so that it is possible to change the shapes very quickly. A new pattern is simply substituted for the one which is least wanted, and the molding goes on exactly as before. In molding the metal, very wide gates and many large risers must be used, because the metal is not easily held in a fluid state. It has to be heated to 3000 deg. Fahr. in melting, but does not hold this high temperature for any length of time, and must be poured quickly. Hence the molds are made up with wide gates and easy bends, so as to lead the metal to the molds quickly, while still hot. This can be noted in the pattern for the gate, used for quickness and convenience, to be seen in the front of the cut, and also visible in the cope at the rear.

Another photograph shows a front and a rear view of a gated group of golf heads, where the gates will be noted to be practically as wide as the widest part of the molds. The large amount of metal in the gates and risers, approximating 50 to 55 per cent of the total metal, will be noted, as well as the size and shape of the leads from the main gate to the individual patterns, very short, wide and with easy bends, to lead the molten metal to place quickly.

The metal is poured from ladles holding 100 to 150 lb., after pouring and deoxidizing with magnesium, using 1½ oz. per 100 lb. This is a continuous process, as many molds being poured each heat as are ready for pouring, and the molding going on continuously. They are bench molded, and are rammed up by hand.

After castings, like those shown, are ready, the excess metal of gates and risers is cut off, and is cleaned before being charged back into the furnaces. An average furnace charge is 40 per cent scrap and 60 per cent new metal. The cutting off is done with a very fine alundum wheel for this small stuff, but large risers are



Front and Rear Views of a Complete Gated Group of Six Heads, Showing the Unusual Width of Gates and Size of Riser

cut off with the oxy-acetylene torch. After cutting apart, the individual castings are ground to a clean, smooth surface.

This is rather a nice job, because the shape as cast closely approximates the shape desired, and only enough metal should be taken off to produce a smooth, even surface. Special holding fixtures are not used, since this would run the expense up too high, but these are approximated by holding the heads in formed soft pine blocks, and grinding them while so held. These blocks are 4 x 3 x 1¾ in., this being large enough, on the one hand, to receive the golf head, and a good size for the workman, on the other.

The head is slipped into a block and held up to the grinding wheel and the grinding completed as quickly as possible. But this is not an instantaneous process, as one might think, for the surface is quite hard and

a number of applications are necessary. One photograph shows this work, with a supply of the partly ground heads visible at the right, and, at the left, some of the wooden forms for holding them in contact with the wheel. As this view shows, a large and wide wheel is used, this being a Norton alundum, 14 x 2½ in., grain 29, grade 2. The operator soon acquires great skill in producing the required smooth surface without

Simple and Quick Method of Grinding Golf Club Heads to a Commercial Finish by Use of Wooden Holding Forms

taking off much metal, and this, in turn, becomes a factor in turning the heads out quickly and cheaply.

After the grinding is completed, the socket for the handle, which has been cored out slightly, is reamed. For this purpose a special taper reamer is used and the heads, which usually have a very mean shape with nasty angles, are held in a special vise with hinged jaws. Both the reamer and the vise can be seen in one view, a drill press being used for this work. The heads are slid into the vise from below, a turn of the handle catches them, the drill press arm is drawn down, moving the reamer into the cored hole. A little more pressure, and in a second the socket is complete. In this form, the golf heads are completed so far as this plant is concerned, and are ready for delivery to the sales agents, who fit the handles and distribute them.

As can be seen, this small part, forming very much of a side line in the beginning, and still not important from a tonnage basis, has nevertheless kept the plant turning over through the dullness of 1920 and 1921, and bids fair to go even further in 1922. The number of heads in 1921 will show close to 40 per cent increase over 1920, and the present estimate for 1922 shows a further increase of about 35 per cent. Considering general business conditions and these figures, we have to go back to our starting point for an explanation that business may be poor, but certain sports or recreations go on forever. A good tip for foundrymen, taken from this instance, would be: "in dull years, get into some form of sporting goods production."

T. E. Keating, general engineer of the Westinghouse Electric & Mfg. Co., presented a paper before the Cleveland section of the American Institute of Electrical Engineers Feb. 21, on "Power Plant Economics with Special Reference to the Steam Turbine."

In 1921 the United States imported 3,365,732 tons of manganese ore, 1,952,848 tons coming from Brazil, 734,516 tons from British India, 965 tons from Japan, 679 tons from Cuba and 676,724 tons from other countries.

Railroads of Japan

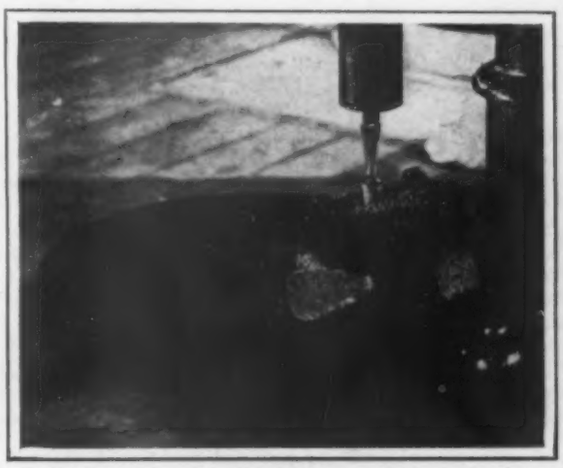
An annual report for the year ending March 31, 1919, with supplementary data for the following year, has just been issued in English by the Department of Railroads of the Government of Japan. This consists of a book of 116 pages, 8½ x 12 in., and includes a large amount of tabulated data concerned chiefly with the financial operation of the state railroads. Some attention is paid also to the privately operated railroads and tramways in Japan. A folder in the back contains a comprehensive map of Japan with the railroad systems clearly outlined.

Some of the outstanding features in the 1920 report include the railroad extent as 6133 miles, the train mileage as 77,222,058, and car mileage as 1,644,562,327. This works out at 21.1 cars average per train and at 26,815 car miles per mile of line. It shows also 1259 train miles per mile of line. Passengers to the total of 357,881,957 were carried a total distance of 7,942,632,396 miles, or an average journey of 22.2 miles. Freight to the extent of 59,939,535 tons was carried an aggregate of 6,293,798,261 miles, or an average of 105 miles per ton. This works out at 1,311,000 passenger miles and 1,026,000 freight ton miles per mile of line.

Small cars are the rule, for the aggregate capacity of the 51,067 freight cars is 570,192 tons, or 11.17 tons per car, on the average. And the average number of passengers carried per car is but 14.8, there being an average of 13.6 cars in each passenger train. Locomotives number 3120, with an aggregate weight of 194,655 tons, or an average of 62.4 tons each.

Labor Efficiency Related to Hours of Work

Labor efficiency, in a statement by the American Engineering Council, is said to be higher with three 8-hr. shifts than with two 12-hr. shifts. This is the conclusion of a committee on work periods in continuous industries, with special reference to the steel industry. Investigations thus far have been to a great extent



Swivel-Jaw Vise and Special Taper Reamer Used in Drill Press to Ream Out Sockets to Fit Handles

outside the steel industry. There are said to be from 40 to 50 industries involving a certain amount of continuous operations, and, as a class, these industries underlie a large portion of our industrial fabric.

As there are still a great many plants operating with 12-hr. shifts, the matter of fatigue and labor efficiency assumes importance. It is estimated that the number of shift workers in the United States is somewhere between 500,000 and 1,000,000. It is also estimated that the number of men on 12-hr. shifts in the period preceding the depression was about 300,000. About as many of these were outside the steel industry as were in it, and, as might be expected, the results in efficiency of working have varied enormously in different plants, depending upon conditions. It is stated that in most of the plants which have recently changed from two shifts to three, efficiency was not greatly improved, due to unfavorable labor conditions.

TAKING INITIATIVE IN BUYING

Importance of Knowing the Market—Where to Get Machines, Supplies, Men

BY JOHN J. RALPH

With the realization that purchasing is an opportunity, that the neglect to buy costs money and that unwise buying is inexcusable, there logically follows the realization that the initiative should be taken by the buyer and not by the seller. The tenseness of the conditions of the past six years has added appreciation to the importance of buying, but not particularly to the betterment of the technique. There developed a realization that buying was a necessity its perfection was assumed to be simply a lengthening of the purse at the buyer's disposal.

There has grown up in our popular business literature a curious appreciation of love and sentiment in the relation between buyer and seller. At times this has been quite gushing. Just a little common sense. There is but one real long time basis for relations between buyer and seller—"The biggest possible re-sale value for a dollar." That is all, just simply value that we can pass on to those who buy from us.

Another bit of cynicism—"Loyalty, like gratitude, is a lively expectation of favors to come." There has been a rather naive feeling that loyalty of the buyer meant coming back as a customer regardless! Nay, nay. True loyalty, like parental love, chasteneth.

It is due to the seller to bring it sharply to his attention when he has failed to some up to or beyond the average. There has grown up a system of extraneous services which have been and are very costly. The buyer has paid for them. When the use of automatic and semi-automatic machinery, and high capacity cutting steels, was in its infancy the services were justified. To-day, he who demands them pays for them and they should not be a general charge on all buyers.

No buyer is interested in anything in his purchase that he cannot sell. Any other service his dollar buys is sheer waste, from a profit standpoint.

Determination of Needs

One of the largest expenses of the seller is that of searching for business and selling. Just as those who buy from you must pay for this, so do you pay for the expense to which those who sell to you have been put. This is particularly interesting, because that additional expense is an item for which there is no tangible equivalent, but which must be passed on to the next customer. If your competitor has found a way to eliminate this, there is only one fund to pay it from—the profit account.

Day after day salesmen tell customers: "If you need it, you pay for it, whether you get it or not." Perfectly logical, is it not? If the material being sold would save them money, they are paying for it and more too—and the profit account shows the loss. If the machine offered is needed, but not bought, the operating and capital account show the expenditure, but inventory and profit account are shy.

Day after day salesmen are saying it to you. And they are proving it. Sometimes it takes three, four, five, even twenty years to prove it. Talk to your own salesmen about their experiences, and check back on that last piece of apparatus purchased, that proved up so handsomely, and see when it was that the salesman handling that line of machinery first approached you on the subject!

You finally came to it and are now enjoying the fruit of it, but how are you going to get back the profits lost through not buying when you first needed it?

Knowing What the Market Affords

The market? How many of us have any realization of the extent of the available supply?

In a little village in Massachusetts is a real buyer. For twenty years he had patronized a small section of the earth for a certain material. He bought in New York from one of three or four jobbers, who in turn bought from three or four German firms. Without doubt they were his best suppliers. For years they had faithfully met his requirements. Having a canny knowledge of the world, and being a real citizen of it, he knew what was happening in 1914, and went into the markets of the world.

Two years later he showed me curiously marked and odd sized barrels and boxes from the interior of China, from India, from Honduras, from Spain, from the Dutch East Indies. Yes, and there were packages which came from New York and California, from Canada and Mexico, and from all between.

Have you asked your salesmen to tell you of their experiences from 1914 to 1921? How purchasing agents, superintendents, owners, came to them seeking this and that? Asking how certain operations could be done. What machines would do the work best, what substitutes could be used for some material to obtain this effect or that? In New York men ran around with rich contracts in their hands, eagerly hunting for men to take them. Some paid three and four prices for second-hand machinery, and begged for supplies.

That was the test of the advancement of purchasing art in this country. Overloaded and at sea, forced to listen to wild demands, and wildly searching for assistance, much of our purchasing talent lost its head and neglected the commonest assistance. Ask your salesmen what purchasing agents they assisted, just by searching the index of THE IRON AGE and turning to the proper page.

Do they remember how cordially they were thanked, and how their word was taken as that of a priest, when they gave information about some other fellow's line—and the dark looks of suspicion when they told of machine capacities, delivery situation and probabilities in their own line?

Conditions have changed. No more do salesmen avoid factories because they cannot make deliveries. Once more they are combing the highways and byways for business. It is once more a buyer's market, but the necessity of purchasing is not relieved. Nor are the rewards of intelligent buying less than they were.

To-day's Opportunities

As the market is world wide, competition will be world wide. Sellers and buyers do not fully realize this. As sellers, how many of us look out of the beaten path for business? How many have considered going away from home to supply other needs? How many have investigated other industries, and far away sections of this country, to see what they have and want?

Who sells us, and from whom do we buy? Do we know what this country affords in materials? Do we know from whom they are to be obtained? Do we know the relative values of materials of different kinds? Do we know the trade practices, how they work to our advantage and how to our disadvantage?

If the foundry now supplying your castings burns up, and your patterns with them, do you know who could turn out patterns for you in the shortest possible time, and whom you could call upon to deliver castings of superior quality?

Suppose the "Old Man" were to bring home a contract to make a new line of machinery, to fit a new mill, to be running before the sugar cane is ripe.

Where will you get the extra drafting and design talent? Who has equipment and shop facilities you can use to supplement your own? Who can supply the special materials necessary in this work? How will you go about to obtain the information you do not know?

How can you send out information of your wants to the concerns specializing in supplying materials for this work—concerns of whom you have never heard?

How will you check up to find the reliability of your new suppliers?

It is not a repeat order. It is a chance to make a single profit, and to fill in the present gap in production, he has seized. Some additional machines will be needed. Second-hand ones will do. Who has them? Where can you find out about them? Who is reliable?

French Investigation of Rail Failures

Causes of the Increasing Number—Effect of Exfoliation —Rapid Corrosion of Rails—Segregation and Poor Quality Metal

IN *Le Genie Civil* for Nov. 19, there is an article taken from a paper on rail failures by the eminent French investigator, Charles Fremont, who was led to carry out this work because of the frequence of rail failures in France. It is estimated the number in France is 2500 to 3000 per year. Records show also the number to be increasing, on some systems such as the Midi and L'Est, at a rapid rate. The rapid corrosion of certain rails in tunnels he finds to be due to the presence of non-metallic inclusions in the metal. This corrosion is also a cause of rapid wearing away because it reduces the useful rolling surface.

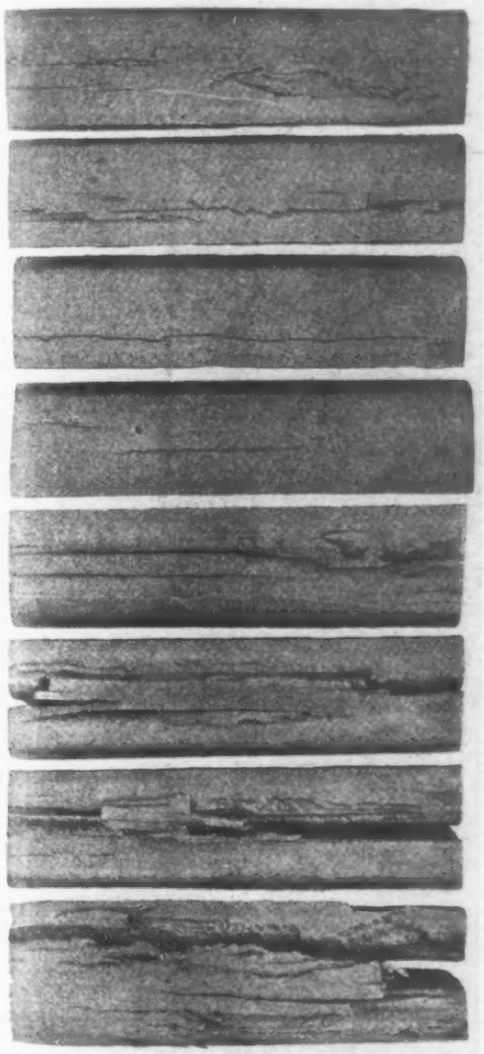


Fig. 1—Exfoliation or Scaling of French Steel Rails

Exfoliation of French rails is shown by the samples in Fig. 1, which exhibit this scaling in different degrees. At the beginning small longitudinal fissures are seen on the running surface. These fissures elongate and join. Often only one line is seen, as shown in the third sample, then later a second line at a distance usually of 1 or 2 cm. Sometimes these two lines appear at about the same time, the part between them is gradually detached, leaving a fissure which gradually increases and divides the head of the rail, as shown in Fig. 2.

The question arises whether the exterior fissures are the cause of the interior cavity or, on the other hand, whether the interior fissure is not formed first and finally reaches the surface. To determine this, cross sections show that wherever the exterior fissure is found, even when very small, an interior cavity is always present; and sometimes wide cavities are found, as shown in Fig. 3, which have not yet reached the surface. The beginning of such a defect is then always in the interior of the rail. In cases where not sufficient discard is taken the pipe is reduced to a fissure. Fig. 4 shows the section of such a rail in which this fissure, enlarged, has formed a blister in the web. In other cases the internal fissure, especially that in the head, does not come directly from the pipe cavity. After etching the section it is seen, Fig. 5, that the fissure passes through several nuclei of impurities. In this case the fissure is produced by the effects of shock

Fig. 2 — Formation of Scaly Surface and Split Head

Fig. 4—Blister from a Pipe

Fig. 3—Large Interior Cavity in French Rail

from the passing trains. Mr. Fremont believes it comes from segregation of the metal and depends on the distribution and composition of this segregation.

The distribution of this segregation in the heads of the rails takes widely variable forms. Sometimes it is condensed in a central compact zone distinct from the sound metal. At other times the central zone is surrounded by nodules of small nuclei. It may be divided into secondary nuclei. Finally the heads of many rails are spoiled by the presence of a zone of blowholes parallel to and a little distance below the surface.

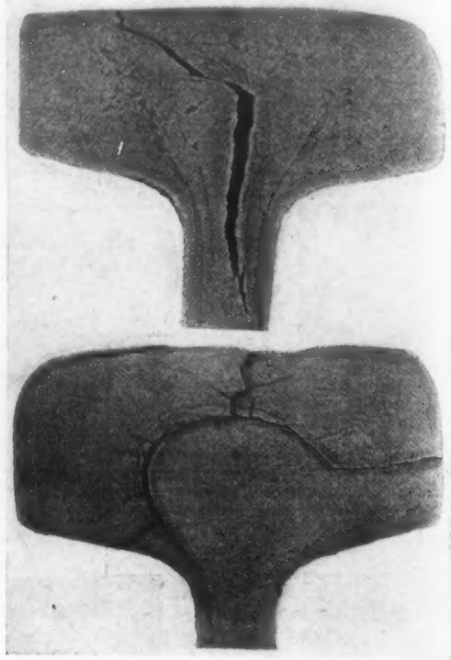
All these zones of impurities, almost concentric, are the cause of various defects. Figs. 6 and 7 give two examples of failure in which the influence of the central zone can be seen. Fig. 7 shows a central nucleus of good material, but surrounded by a segregated zone, from which emanate the radial fissures that are particular to this rail, and finally caused failure. Experimental tests would indicate that the fissures travel from one small nucleus of impure material to another, as shown in Fig. 8 of heads fractured in service.

After a further discussion of the matter Mr. Fremont believes the exfoliation or scaling of the rails to be due to bad initial quality of the steel, and not to fatigue of the metal brought about by cold work, as has been sometimes suggested. Careful tests with a specially designed hardness measuring device show that the cold worked material on the head only extends in 0.14 mm., and even with a softer rail the depth was only 0.23 mm.

The article closes with a description of superficial quenching of the metal of the rolling surface, as mentioned in a recent report by Mr. Howard, and the danger of the cracks in this hardened layer extending through the rail if the metal is not sound. G. B. W.

Fig. 5 (Above)—Interior Cavity Passing Through Nuclei

Fig. 8 (Right)—Rails Fractured in Use



Figs. 6 and 7 (Right)—Upper Is a First Fissure at Central Nucleus; Lower Is a Fissure at Periphery of Central Zone. Both are reduced one-half from an original magnification of two diameters

Budget of the St. Louis-San Francisco Railway Co.

The budget of the St. Louis-San Francisco Railway Co. for 1922, providing for considerable buying, has just been completed. President Kurn, writing to THE IRON AGE, says:

"Our 1922 budget does not provide for any additional locomotives, but we do contemplate purchasing eight 70-ft. all-steel coaches and six 70-ft. all-steel chair cars, which equipment is to be used in two of our important through main line trains.

"We propose to lay approximately 185 miles of new 90-ft. rail, but all of this rail is on hand or contracted for.

"On shop tools and machinery we figure on expending approximately $200,000, most of which is in the nature of machinery for maintaining equipment and consists of engine lathes, traveling cranes, steam hammers, forging furnaces, and miscellaneous mill shop machinery. The largest single item contemplated is the erection of a 200-ton electric traveling crane at our West Shops, Springfield, Mo. This crane will enable us to handle our Santa Fe type locomotives much more economically than at the present.

"So far as additional shop buildings are concerned, we have nothing in mind for the present year except a few minor extensions to round houses.

"We propose to do considerable grade reduction at Crocker, Garnsey and St. John, Mo., where grades will be reduced for a distance of 1.62, 1.50 and 3.57 miles respectively at an estimated cost of $675,000, and we also contemplate the construction of 4.75 miles of second main track from Windsor Springs to Valley Park, Mo., which will give us double track from St. Louis to Valley Park, where our traffic is exceptionally heavy, due to the number of regular freight and passenger trains and suburban trains which operate in this territory. Between Spring Hill and Paola, Kan., a distance of 12.7 miles, we are going to construct the second main line which will give us double track from Kansas City to Paola. Our traffic in this territory is exceptionally heavy, due to the M. K. & T. using our track between these two points. We have already asked for bids from responsible contractors on the two pieces of double track and the three pieces of grade revision."

A joint convention of the Indiana State Sheet Metal Contractors' Association and the National Sheet Metal Contractors' Association will be held May 15-19 at Indianapolis, in the Cadle Tabernacle, a building that seats 10,000 persons. One of the features will be the sheet metal products exposition. All of the space for the exposition has been taken. Joseph Mattingly, president of the Indianapolis association, is one of the committee on arrangements.

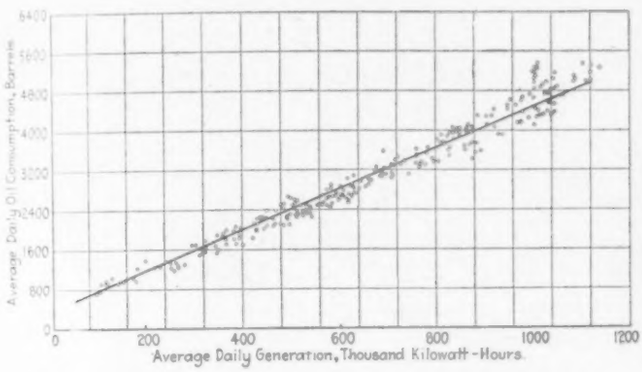
Operation of Oil-Burning Steam Plants

Discussion of the Plant Characteristic Diagram, with Particulars Regarding Its Use in the Establishment of a Standard of Performance and in Increasing Plant Efficiency

BY C. H. DELANY*

TEN years ago there were many plants operating reciprocating engines, in which the maximum performance obtained was not over 150 kwhr. per bbl. of oil. With the high-pressure steam-turbine plants of to-day a record of 330 kwhr. per bbl. has been made. This increase in efficiency has been brought about by introducing more efficient machinery and increasing the range of steam pressure in the prime mover. The introduction of the steam turbine to replace the reciprocating engine effected a remarkable saving in fuel. Moreover, the steam turbine caused a saving in operation due to the fact that its operation does not depend on the personal element in the plant.

In reciprocating engines there were many adjustments to be made by the engineer in charge, and the economy obtained depended very largely on his skill and the care with which he made these adjustments. With the steam turbine, however, there is nothing that the operator can do to improve the efficiency, after the machine is once installed and placed in good operating condition. While this is true as regards the prime mover, it is not true in regard to many other features of the power plant.



Plant Characteristic Diagram for a San Francisco Station

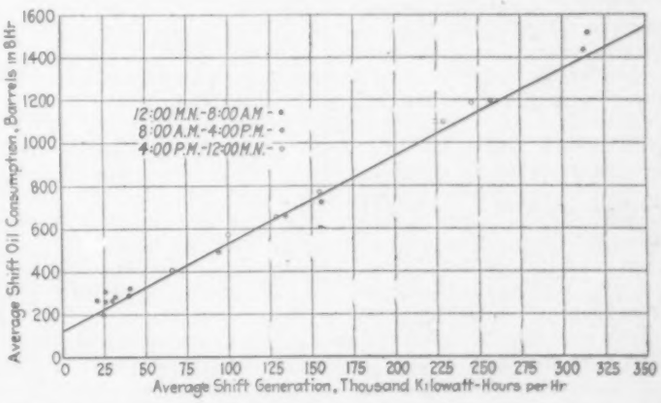
In the boiler room, particularly, there are many points where the operating engineer can effect a saving if he carefully studies the situation and pays attention to the small details. In condensers and vacuum pumps also a great saving can be made if proper attention is paid to maintaining a high vacuum. There is still, therefore, a large field for the operating engineer in improving the economical operation of the plant, and the question of operating efficiency is consequently one worthy of careful study.

Many tests have been published showing high efficiency of boilers fired with fuel oil, efficiencies as high as 80 and 82 per cent being not uncommon in test reports. It is very rare, however, that any such high efficiencies are obtained in the regular operation of power plants. To maintain high efficiency in regular operation, the first requisite is some means of comparing one day's operation with another.

In oil-burning electric power plants it is customary to report the economical operation of the plant in terms of kwhr. generated per bbl. of oil. This is an excellent method of comparing one day's operation with another, provided there is steady load on the plant and conditions remain the same from day to day. With a variable load, however, such as occurs in an ordinary central-station plant, it is always found that the economy is much better at periods of heavy load, and poorer at periods of light load. Thus it is possible, with a fairly heavy load on the plant, to secure from 220 to 230 kwhr. per bbl. of oil without difficulty, whereas with the same plant operating at a light load, it may be difficult to secure more than 150 kwhr. per bbl. of oil.

When the good results are obtained with the heavy load, the operating men consider results better than the average. On the days of light load, when the results are poor, they do not worry but say, "What's the use, you can't expect any results with such a light load." Thus in neither case is there any incentive to improve the economical operation.

Another reason for more or less lax methods, so far as efficiency is concerned, is the fact that efficiency must always be secondary to continuity of service. The men know that any interruption to service will be a matter of close investigation on the part of the management, and they devote all of their energies to maintaining the plant in operation and keeping the lights burning. For instance, if a fireman in endeavoring to adjust carefully the air supply in his boilers neglects to keep up the steam pressure, with the result that the turbine slows down and some of the load has to be dumped, he is sure to be called on for an explanation. If, on the other hand, he keeps up the steam pressure, but neglects to regulate the air in the proper proportion, there usually will be no complaint; and the boilers may be allowed to operate in this inefficient manner for a considerable length of time.



Plant Characteristic Diagram with Scale Altered to Show Results Obtained on an 8-Hour Shift

The author is far from disputing the fact that continuity of service is a matter of prime importance, but he does wish to point out that efficiency is a close second. The problem before us, therefore, is so to interest the operating men in the matter of efficiency that they will not neglect the various operating details that must have attention to secure good results.

To improve these conditions and to interest the men in the problem of efficiency, it is essential to devise

*Pacific Gas & Electric Co., San Francisco; abstract of a paper presented at a joint meeting of the San Francisco sections of the American Society of Mechanical Engineers and the American Institute of Electrical Engineers.

some means of comparing the performance of a plant from day to day. For this purpose, the diagram here called the "plant characteristic diagram" has been plotted.

Such a diagram, as shown for one of the San Francisco stations, consists merely in plotting the oil consumption against the kwhr. generated. Each point in this diagram represents one full day's operation, and while the points as shown are more or less scattered, it is apparent that they form a well-defined line. It is thus possible to draw a straight line through the midst of these points in such a way that it will represent the average location of all points in the diagram.

Use of Diagram as Standard for Guidance

Having once been drawn through the points as described, the diagonal line may be used as a standard for the guidance of the men in future operation of the plant. Thus each day the kwhr. generated and the oil burned the day before may be plotted on this diagram. If the point so plotted falls below the diagonal line, it is evident that the results obtained are better than the standard. If the point falls above the line, too much oil has been used, and something requires a special investigation. Since the diagram takes in all loads from zero up to the full load on the plant, it allows for the poor economy obtained at light loads. It is thus possible for the operating men to know immediately whether they are keeping up to the required standards of efficiency or running behind. They can therefore investigate causes of low efficiency immediately, while all matters entering into the plant operation are fresh in their minds.

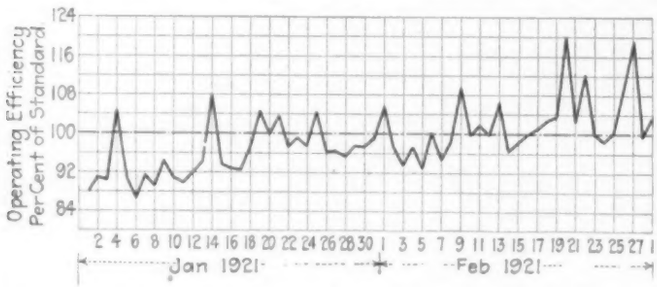


Diagram of Operating Efficiency of a Plant Over a Two-Months' Period

In adopting the standard it would be possible, instead of drawing a line through the average of the points, to draw a line through the best points, thus establishing a standard that would represent the best results yet obtained from the plant. Again, it would be possible to establish a higher standard by drawing a theoretical line below all of the points, this line to be based on the steam consumption of the turbines and auxiliaries, as determined by tests, a boiler efficiency of, say, 80 per cent and the best possible vacuum; in other words, a line representing ideal conditions.

In adopting the average line as the standard it is felt that the men will have greater confidence in the method than if a theoretical line had been adopted. The average line is really a standard that has been established by the men themselves. It is not an arbitrary ideal impossible to attain, but as it represents the average already attained, it should be as easy to improve on the results represented by the line as to fall below them.

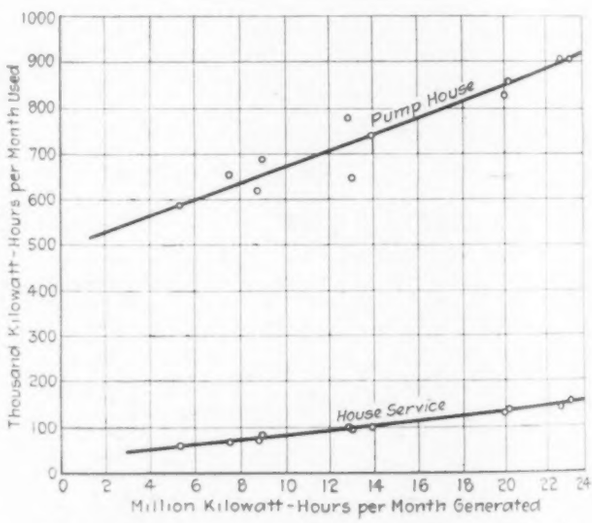
If the men are successful in improving on the standard each day, it is obvious that the average for a given year will represent better efficiency than the average for the previous year. With all of the points falling below the line on the diagram, another line drawn through the average of these new points would also fall below the original line.

A similar diagram, but with the scale altered so as to show the kwhr. generated and the oil burned during a period of 8 hr. instead of 24 hr., may be used by the different shifts in the station, so that each shift can check up its own performance and compare it with the performance of the other shifts. A large diagram of this form is posted on the wall of the fire room, and different colored pins to represent the different shifts are inserted each day, so that the diagram shows at all times which shift is running above the line and which below it. This system has a far-reaching effect in awakening interest, and leads to such rivalry and competition to improve the efficiency that the laxity which previously existed is disappearing.

Operating Efficiency Determination

There is one objection to the diagram—it does not indicate the order in which the records are plotted, and therefore does not show whether the results are improving as time goes on.* To overcome this objection, and also to enable the operation of different plants to be compared with each other, the term "operating efficiency" has been introduced. Operating efficiency as used in this connection means the percentage of standard attained for the day's run. "Operating efficiency" is entirely distinct from "boiler efficiency" or "turbine efficiency" or "thermal efficiency" or "Rankine-cycle efficiency." All of these enter into the operation of the plant in determining the standard. Operating efficiency is merely a comparison of the results, actually obtained, with the standard.

Determining operating efficiency can best be shown by an example: During one 8-hr. shift there were generated 313,000 kwhr., and 1440 bbl. of oil were burned, representing 217 kwhr. per bbl. From the diagram it is found that for a load of 313,000 kwhr., with standard efficiency, there would be burned only 1400 bbl. of oil, which would be equivalent to 224 kwhr. per bbl., as against the actual result obtained of 217 kwhr. per bbl. The operating efficiency is therefore 97 per cent. During another 8-hr. shift, where there were only 25,000 kwhr. generated, the oil burned was 200 bbl., equivalent to 125 kwhr. per bbl. From the diagram it is found that for 25,000 kwhr. with standard efficiency the oil burned would be 220 bbl., equivalent to 114 kwhr. per bbl. This operating efficiency is therefore 110 per cent. It is thus seen that, although in the second case there were only 125 kwhr. per bbl. obtained, as against 217 in the first, the operating efficiency was actually higher in the second case.



Power Used by Electric Auxiliaries in a Station, Plotted Against the Total Generation

This method of determining operating efficiency makes allowance for inefficient machinery, for it is just as easy to obtain 100 per cent operating efficiency in a plant having old-fashioned turbines of poor design as in a plant having the most up-to-date machines, for the standard is based on the actual records of the plant itself.

One chart shows operating efficiency plotted for

*There is a second: It does not distinguish between a day or shift during which the average kwhr. and the maximum kwhr. are nearly the same, and one during which they vary heavily. In the former case the results should be much better than in the latter. [Editor.]

each day during the months of January and February. In this diagram, the horizontal line at 100 per cent represents standard efficiency, and the zigzag line the actual operating efficiency obtained each day. The records show a gradual improvement during the period, which is a direct result of the attention to small details brought about by this method of checking up efficiency.

Since the diagonal line in the plant characteristic diagram is usually a straight line, it can of course be represented by a simple equation, namely:

$$y = a + bx$$

where y is the oil consumption in a given period in barrels or pounds, x the kwhr. generated in the same period, and a and b are constants.

Evidently the constant a is equal to y when $x = 0$. In other words a represents the quantity of oil burned for zero load; that is, the amount required to keep up steam on the boilers, keep the turbine running up to speed, operate the vacuum pumps, circulating pumps and other auxiliaries, and keep the entire plant in readiness to take on load at a moment's notice. Obviously a will be larger if two turbines with their auxiliaries are kept in operation than only one, so that its value depends on the amount of load the plant is expected to take on. Where a plant is operated as a standby to a hydroelectric system and is kept in readiness to pick up its full load instantly in case of trouble, a will have a higher value than where it is possible to shut down the turbines gradually, one after the other, as the load falls. The constant b evidently represents the additional amount of oil burned in proportion to the load carried on the plant. It determines the slope of the line in the diagram, and is large for uneconomical turbines or engines and small for the most efficient types. The equation of the line for an 8-hr. shift, in terms of barrels of oil and kwhr., is

$$y = 120 + 0.0041\,x$$

Other Uses of the Diagram

The diagram may be used for many other purposes besides the overall efficiency of the plant. By plotting the steam generated against the oil burned in one diagram, and the steam consumption against the kwhr. generated in another, it is possible to study the boiler-room and engine-room operations separately, and thus quickly locate the cause of low efficiency. By setting separate standards for the boiler-room and engine-room crews, responsibility can be more definitely fixed, and the advantages of the system of operation greatly enhanced.

Since boiler efficiency usually decreases rapidly as the load increases above the boiler's rating, a single boiler will naturally have a curved characteristic. In a plant containing a large number of boilers, however, the boiler-room characteristic will be approximately straight until the load exceeds the economical capacity of all the boilers in the plant, after which it will begin to curve upward. A curved line, based on previous performance, is just as satisfactory as a straight line for setting standards and calculating operating efficiency in the manner described. A last diagram shows the power used by electric auxiliaries in a station, plotted against the total generation, and is of interest in showing that the points do form well-defined straight lines, and that the same methods may be used for standardizing these items as for fuel consumption and steam consumption.

To sum up, the essentials for securing the best efficiency in power-plant operation are:

1. A fair standard by which the daily performance can be measured and compared with previous results, at the same time giving the operating men a definite goal to which to work.

2. Means of comparing results obtained by different groups of men, such as different shifts of one plant or the crews of different plants, and the posting of this comparison so that the men can see the results of their efforts.

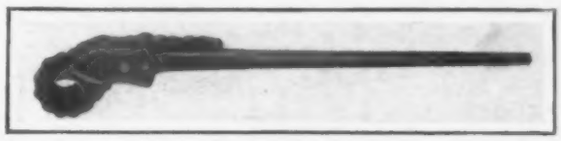
3. A system of reports that keeps up the interest of the men, combined with suggestions and advice that show where losses occur and how they may be avoided.

If the operating men are kept interested, see the results of their work, and have a definite standard to reach, they will do their best. As interest flags, some sort of bonus or prize for the crew showing the best operating efficiency will stimulate them to greater effort, and by guiding this effort by means of thoughtful analysis of the technical features of the power plant, maximum efficiency may be obtained.

New Chain Pipe Wrench

An improved chain pipe wrench made in seven sizes for pipe and fittings from ⅛ to 16 in. in diameter is being offered by the Armstrong Brothers Tool Co., Chicago. The illustration shows the wrench equipped with flat link chain; cable chain is also supplied.

The improved design is intended to eliminate some of the weak points of the usual tool of this kind, especially the tendency of the jaws to work loose on the bar, resulting in spreading of the rear end of the jaw and wedging of the chain. Increased bearing of jaw sockets upon the bar, combined with two hardened chrome-nickel steel bolts are said to effectively hold the jaws in place under the most severe usage. The rear



Improved Chain Pipe Wrench

bolt is located directly under the chain socket where the spreading strain is greatest.

Chain guides are provided on the jaws. The handles are forged from high carbon steel and the jaws are drop forged from special steel, treated and hardened.

New Eye Protector

The goggle shown in the illustration is a recent addition to the line of eye protectors offered by the Chicago Eye Shield Co., Chicago. It is known as style No. 220 and is intended to permit of unusually wide range of vision and comfort.

The special features are the lens-retaining bar which is locked with the headband and the collapsible

The Lens Retaining Bar Is Locked with the Head Band

and adjustable nose bridge which permits adjustment of the goggle to the correct pupilary distance of the wearer. The goggle is regularly furnished with a rubber binding which provides a smooth bearing against the face.

Ericsson's Monitor to Be Commemorated

A DeLamater-Ericsson commemoration, with the unveiling of four bronze tablets, will be held March 9, the sixtieth anniversary of the battle between the Monitor and the Merrimac. One of these tablets will be fixed to the site of the residence of Captain Ericsson, Beach Street, New York, with the ceremony in charge of the American Society of Swedish Engineers. Another will be raised on the site of the Phoenix foundry, where some of Ericsson's work was done; another at the Cunard pier No. 54, the site of the DeLamater Iron Works, and the fourth at the Continental Iron Works, Brooklyn. A banquet will be held at the Waldorf-Astoria Hotel, New York, and a simultaneous banquet will be held in Stockholm, Sweden. Further information may be obtained by applying to H. F. J. Porter, of the DeLamater-Ericsson Commemoration Committee, Engineering Societies Building, 29 West Thirty-ninth Street, New York.

Disintegration of Blast Furnace Linings

Split Furnace Shells Undoubtedly Due to Expansion of Zinc-Impregnated Linings—Remedies Suggested

BY PAUL O. MENKE*

WITHIN recent years blast furnace men have become more or less alarmed over the repeated failures of blast furnace linings. In some districts it is no uncommon occurrence to burst furnace shells; in fact it became such a regular thing at one plant, that it has led to the design of a very ingenious banding lug for banding shells whenever they show signs of giving way. The first few failures were confined to a certain well known brand of steam pressed brick. Shortly afterward, other well known and popular makes of furnace linings began to give out. All of these early failures were confined to steam pressed linings, but recently there has been found disintegration in some well known hand made linings. The probable reason that the failures have not been more numerous in the hand made brick is on account of the popularity of steam pressed linings.

On Jan. 12 an editorial appeared in THE IRON AGE *suggesting that zinc played an important part in the disintegration of blast furnace linings and consequent bursting of furnace shells. Investigations carried out by Paul O. Menke and set forth in the accompanying article very largely confirm this interesting theory. His findings may suggest to furnace operators a line of study that will eventually eliminate trouble from this source.*

Poorer Brick Not Wholly Responsible

There is no doubt that the quality of most of the popular brands of fire brick has greatly deteriorated during the last five or six years, principally due to careless and inefficient labor, over which the maker had no control, but some of this is probably also due to mixing in some inferior clays. The proportion of plastic clay was increased beyond the usual ratio. The flint clays were ground finer in order to make a nice looking brick; in fact most of the furnacemen in recent years have laid too much stress on getting a smooth, nice looking fire brick that would lay up with minimum cutting and labor. Nevertheless, all of these changes do not account entirely for the trouble.

Early last year, while visiting a large Eastern plant, the author's attention was drawn to some shell failures. Some of these were light shells, but one of them was built out of 1 in. plate, well riveted and butt strapped—in every way a first class job. It had a steam pressed lining laid against the shell without any packing space. This shell had started to split vertically several sheets above the mantle. At the time, this was attributed to the probable expansion of the steam pressed brick.

On looking over the shell, some matter was noticed at the point of fracture which looked like a deposition of zinc fumes. On having the deposit analyzed, in addition to taking a drilling through the crack and having some of this brick material analyzed, zinc was found.

Several Furnaces Examined

Shortly afterward, there occurred a very bad shell failure with fatal results, which was generally attributed to an explosion. As this mishap was so unusual, and of such fatal consequence, it alarmed most all of the furnacemen who heard of it. Photographs of this wreck seemed to show the action of zinc impregnation and disintegration. The manager insisted there was no zinc, as he did not use any zinc bearing raw material. Examination of the furnace revealed a distinct vertical separation and cleavage of the remaining portion of the inwall and although no metallic zinc was found particles of zinc oxide were discernible in this cleavage. Later analysis of the brick material showed zinc to be present in the oxide, chloride and metallic state, as high as 40 per cent down to 0.15 per cent.

With zinc impregnation as high as shown in the analysis presented, it does not seem unreasonable at all, knowing the terrific strain that a zinc saturated lining exerts, that it split this shell, particularly as it was water cooled. A splash jacket prevented the operators from promptly detecting any signs of the splitting of the furnace shell. With the shell split it would not necessarily take a very heavy slip to put on enough additional strain to tear horizontally and open up.

Some furnaces that had been banked for several months were shoveled out. One of these had a considerable "belly" in the lining, extending from the mantle to 30 ft. above the mantle, reaching less than one-third of the way around the furnace. The brick was well glazed and hard for a depth of 4 to 12 in. back to the inner face of the lining. Beyond that, was a zone of separation and spalled cleavage for a distance of ¼ in. to 2 in. This space was filled with zinc oxide, metallic zinc and large carbon deposits; zinc oxide from 2 to 20 per cent. Beyond that, for a distance of 2 to 4 in., the brick was disintegrated and crumbly, saturated to the extent of 0.03 to 6.82 per cent of Zn. Beyond that point, extending to the shell, the brick was firm and in a good state of preservation, with practically no zinc impregnation. The balance of the lining seemed very good, and had worn back less than 2 in.

Two test holes through the good lining back to the shell, opposite the bad place, disclosed no disintegration. The face of the brick was glazed and firm, and really harder than it would be in the original state. Metallic zinc appeared in the joints, also some oxide of zinc about 12 in. back from the inner face of the lining, but this had in no way penetrated the brick.

Some spray cooling on the outside of the shell on the thin spot of this furnace may have been the cause for disintegration at this point. This furnace was lined up with the same make of steam pressed brick that had given more than 800,000 tons during the preceding blast, and was in good serviceable condition when blown out.

On finding this condition at this furnace test holes were cut above the mantle at another furnace that had been lined up with the hand made brick of a popular make. This lining had been stored over five years, so must have been made at a time before disintegration of furnace linings had become alarming. The inner face was glazed and firm for a distance of about 4 in.

*Superintendent of blast furnaces, Shenango Furnace Co., Sharpsville, Pa.

From there on, zinc was found, both metallic and oxide, and disintegration to the extent of making the brick soft and very easy to cut, to within 4 or 5 in. of the shell. The conditions were identical at the two opposite points of the furnace. However, the holes were plugged without further repairs, and this furnace is operating to-day.

On the strength of these observations some of the more prominent cases of disintegration were made the subject of closer investigation. In one particular case where two linings had been lost zinc was found up to 18 per cent in this brick. Considerable of this was metallic, but apparently was not blamed for the disintegration of these linings.

Zinc Evidently the Cause of Failure

Our own experience in this matter has been expensive, and the cause of great delay. Nine or ten years ago, on account of low phosphorus content, our furnaces had used a proportion of Blue Billy agglomerates in our burden. First a shell split on the smaller furnace which had seen considerable service. This shell had to be renewed. Within two years a larger, newer furnace opened up her shell both in the vertical and horizontal seams, in the heavy section. We promptly banded this furnace. She burst these bands until we put on 12 by 1½ in. bands, very closely spaced. After that, the pressure sheared the horizontal seams of the shell, and showed swellings and distortions on the side of the furnace. This furnace was excessively water cooled in the bosh, and also had cooling plates above the mantle. Most of the trouble and breaks in the shell took place in the cooled zone. More or less metallic zinc was evident around the bosh plates of the furnace.

When it became necessary to put this furnace out for renewal of stack, it was impossible to blow it down more than thirty-five ft. as it shook so badly as to make it unsafe. On taking this lining out we found the most complete disintegration we ever saw. It was not burned out in any way, but had the full thickness of the lining, in addition to some scabs on the inside. It was not necessary to use any picks or steel bars, but the lining was shoveled out. The full outline of the brick and joints was visible until we got to the water cooled portion, where the zinc showed up, mostly in the metallic form, probably due to the water cooling.

On making an analysis we found zinc up to 49.86 per cent in the lining, and up to 40 per cent in the scab and scaffold. In fact lining and scab were so rich in zinc that it was sold to a chemical company for the recovery of the zinc. A considerable portion above the water cooled section was in the form of chloride of zinc.

On finding this condition, we put up a 1 in. shell, discontinued the cooling above the mantle, reduced the cooling below the mantle, and cut out Blue Billy agglomerates and other zinc bearing material. A steam pressed lining was laid tight against the shell, following the same practice used on our other furnaces with the lighter shells. Results were satisfactory, until we ran into zinc recently. Very probably we would not have encountered any difficulties even then, if we could have kept our furnaces running, but banking, shoveling out and cooling largely aggravate this condition.

Chemical Reaction Quite Simple

It might be well to give a brief outline of the action of the zinc in the furnace. Being charged into the top as zinc oxide, finely disseminated through the ore, it descends unchanged to the fusion zone, as the reduction temperature is 1000 deg. C. and over. The zinc oxide is reduced by solid carbon to metallic zinc; liberated as vapor, it ascends with the gases to the cooler zones. The zinc is re-oxidized through the temperatures from 1000 deg. to about 500 deg. C., the reaction being $Zn + CO_2 = ZnO + CO$, and is carried up by the gases as zinc oxide. The larger portion passes out into the stoves, dust catcher, boilers or into the atmosphere. A portion redeposits on the descending stock to repeat the before-mentioned cycle of changes.

Some of the zinc vapor is absorbed by the lining up to as high as 50 per cent. It usually shows up as small yellow crystals. Sometimes it is found with carbon deposits in the disintegrated and laminated portions of the lining. Some of this zinc shows up in the metallic form. It usually is around the water cooled part of the furnace, also in the part of the lining that is not water cooled but had a chance to cool down after banking or blow out.

In scabs that adhere to the water cooled portion of the furnace, it probably combines with the alumina, forming zinc spinel, which is practically irreducible, as these scabs are largely intact, after the furnace has been blown out. It is also generally assumed that the zinc oxide combines with the alumina in the fire brick. As the coefficient of linear expansion of zinc is like 60 to 1, compared to silica, which is the principal constituent in fire brick and is about 3 to 1 compared to steel, it can readily be seen that it would not take a great deal of impregnation to destroy the bond of the brick and exert great expansive stresses. The hand made brick, on account of its greater porosity, has a tendency to take up more of this element than the steam pressed.

Remedies Suggested

Most of the Blue Billy agglomerates carry zinc, which can easily be guarded against, but as some limestones carry traces of zinc, also some of the Lake Superior ores, it makes it rather hard to be absolutely sure there is no zinc bearing material charged into the blast furnace. No matter how low the percentage of zinc is in the raw material, gradual accumulation will cause it to show up in time.

It is hard to see why it should be in any way detrimental to lay a lining against the shell without packing space, and particularly so, steam pressed brick which is a good conductor of heat, and would warm up the shell to a point where it can expand with the brick work. Most blast furnace lining brick should be somewhere near neutral and not subject to a great deal of expansion under heat. By using a heavy shell, (if necessary above 1 in. thick), eliminating the water cooling above the mantle the trouble should be reduced to a minimum. It might also be well for the fire brick makers to make experimental tests to find the resistance to zinc fumes of their various makes of bricks.

Automatic Train Control Devices

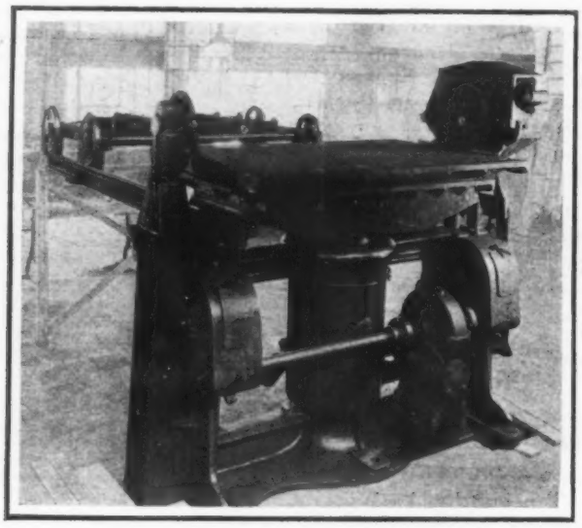
WASHINGTON, Feb. 21.—Taking official notice that parties interested in particular automatic train control devices are giving the impression to the public that it has approved their devices and ordered the railroads to install them, the Interstate Commerce Commission last week issued a memorandum to the press saying that it desires it to be understood that the commission's order of Jan. 10 requiring 49 carriers to show cause why they should not install control devices does not prescribe any type to be used. The only requirement, the statement points out, is that installation shall pass certain technical specifications and requirements which have been found to be necessary for the successful operation of devices of this character. These are so broad, the commission says, through Secretary G. B. McGinty, as to afford the desired freest field of opportunity for inventors and for trying out all automatic control and train stop devices.

NEW OSBORN MOLDING MACHINE

Air-Operated Jolt — Electrically-Operated Roll-Over Pattern Draw and Run-Out Car

A molding machine equipped with the standard air-operated jolting mechanism, combined with an electrical roll over, pattern draw and an electrically-operated run-out car has been developed by the Osborn Mfg. Co., Cleveland.

The machine is shown in the accompanying illustration. It is compact and self-contained. The mechanism is assembled on a large frame which is cast integral and without bolted parts. The mechanisms are inclosed and where necessary operate in an oil bath. The



The Roll-Over Device Is Electrically Controlled. Pattern draw and run-out car are electrically operated also. Ramming is by compressed air

machine rotates on the approximate center of gravity of the load, an arrangement intended to reduce rolling-over strain. The jolting operation is performed by compressed air at 80 lb. pressure and the jolt controlled by the company's single-piece, air-balance piston-type valve, adjustable to give the desired force of blow.

The roll-over operation is effected by an electric motor transmitting its power through a worm wheel and a pair of spur gears directly connected to a narrow drum for coiling the cable attached to the bottom of the lifting rods. Either push button or manual control is used. The motion is said to be steady and positive and the table, being rigidly held throughout its travel, cannot sway or swing. Although the operation is automatic, rolling over is under control of the operator and may be stopped in any position.

Pattern drawing is by one rolling-over mechanism, but is electrically controlled to secure a speed of only 1½ ft. per min. during the time necessary to loosen and start the pattern. The remainder of the draw is accomplished at high speed. Rolling over, lowering and drawing of patterns are all performed by moving the handle around the marked dial of the controller.

After the mold is rammed and ready for rolling-over, the controller handle is placed at the "rolling-over" position. After the roll, the machine stops automatically. The run-out car is brought into place by its motor and also stopped automatically. The table is locked into position and the controller handle swung to the "lower" mark on the dial. The mold then lowers until it makes contact with the automatic lowering device on the run-out car and stops automatically. The mold is then prepared for drawing by releasing the clamps and setting the vibrators in motion, after which the controller handle is turned to "slow draw." As the slow speed is used only to loosen the pattern, the controller is left at this point only for 2 or 3 sec., after which it is moved to the notch marked "fast draw." The pattern is then rapidly withdrawn from the mold, automatically stopping at the top of the stroke.

In lowering the machine to the jolt position the run-out car is propelled from under the table to the end of its track. The table is unlocked and the controller handle is placed again at the lowering position, and the table automatically comes to rest on the jolt table. This completes the cycle of rolling over the mold and withdrawing the pattern which, with the jolting operation, makes the total time consumed by the machine per mold approximately 2 min.

The number of blows desired to jolt the mold is predetermined, and by moving the jolt-operating lever to the number of blows desired, the machine will continue jolting, automatically stopping when that number is reached. The machine is easily lifted into place on the foundation by a crane or hoist. Very little assembling is necessary. The foundation is cast in one piece, and since the machine operates on its own center of gravity, it is not necessary for the foundation to be heavy enough to counterbalance over-hanging loads.

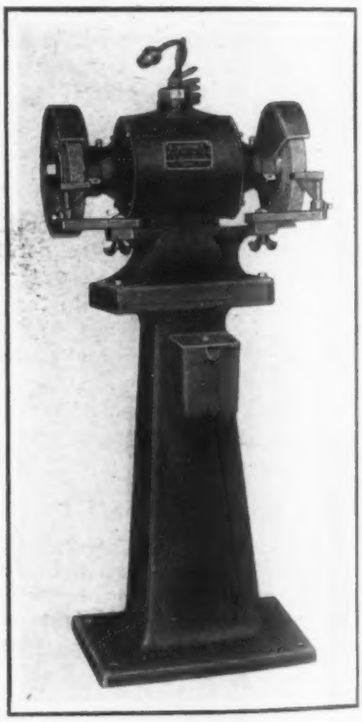
Close control is obviously a feature. Among other advantages it is claimed that electrically-operated pattern draw eliminates jerky motion so dangerous to the mold, the speed of drawing being certain and instantaneous; lowering of the roll-over table is begun instantly upon placing the control handle in the lower position; and the motion in rolling over the mold is constant, steady and positive, without strain or shock. When lowering the roll-over table to its jolting position it is unnecessary to start the table rolling by hand.

The machine is built in capacites from 5000 to 20,000 lb. and in various heights and flask lengths.

Alternating-Current Grinder

A ½ h.p. alternating-current electric grinder in both floor and bench style has been placed on the market lately by the Standard Electric Tool Co., Cincinnati.

The machine is shown in the accompanying illustration. It is fitted with double-row ball bearings, and a Westinghouse motor with the latest type of Westinghouse circuit breaker is used. The machine can be equipped for either 110 or 220 volts, single, two or three phase. The grinding wheels are 8 in. in diameter, with ¾ in. face and ⅝ in. hole, and are extended well out from the body of the motor to facilitate the grinding of long and irregular work. The floor type is fitted with a water pot and both types have adjustable tool rests.



Grinder for Operation on Alternating Current

The motor is powerful and is quick to start on a single-phase line and a quick make-and-break switch is located on top of the motor within easy reach. Ten feet of re-inforced cord fitted with a plug is furnished, the regular equipment including also one fine and one coarse grinding wheel. The bench type machine weighs 110 lb. net and the floor type, 225 lb.

The next annual convention of the Southern Supply & Machinery Dealers' Association will be held in Birmingham, Ala., April 24, 25 and 26, 1922, with headquarters in the Tutwiler Hotel.

THE X-RAY IN METAL ANALYSIS*

Some German Results — Work of Von Laue — Detecting Presence of Tungsten

The idea of using the X-ray as an aid in determination of the internal structure of metals followed closely Roentgen's momentous discovery. More than 20 years ago the English scientists Heycock and Neville investigated the nature of alloys by these means. They found that the opacity of metals to the rays was in general closely related to the atomic weight. They therefore made alloys of the light metals, such as sodium and aluminum, with the heavy ones, lead, silver and gold. From these alloys, after rapid or slow solidification, were cut horizontal and vertical slices of about 1 mm in thickness from which X-ray photos were made. These showed in some cases (the sodium-gold alloy for example) a simple separation of the components without the formation of either alloy crystals or compounds. In the sodium-gold alloy the shadows of the sodium crystals and the heavier ones of the gold alloy, both imbedded in the eutectic mixture, give a complete picture of the metal structure.

In considering the use of X-rays in the metallography of iron and steel we are confronted with the fact that the most important elements met with in ferrous alloys, namely manganese, nickel, chromium and vanadium, have atomic weights so close to that of the principal constituent that a practical differentiation of their opacity cannot be expected. Carbon and silicon have indeed less opacity than iron, and separated graphite which is 400 times as translucent as iron will be recognizable in the X-ray photograph. On the other hand the transparency of cementite or the carbide of iron Fe_3C cannot be more than 25 per cent greater than that of ferrite, while the low carbon alloys show still less difference. Under these conditions the X-ray method of analysis cannot compete with the splendidly perfected methods of metallography. For the separation of silicon the conditions are still more unfavorable.

The X-Ray and Tungsten Steels

Only in the case of tungsten steels is it possible that the X-ray method might be preferable to the microscopic. Tungsten has the atomic weight 184 which is more than three times that of iron, while its opacity is 100 times that of the principal metal. The presence of tungsten in steel can be detected even in the presence of pearlite or the double carbide, and indeed in cases where the metal consists of a homogeneous mixture of martensite crystals. In fact, in the latter case a quantitative determination is possible by measuring the depth of shading in an X-ray photograph of the alloy and comparing it with the photograph of a similar strip of soft steel.

The measurement of the depth of shading has been brought to a high degree of perfection, so this method is promising. Other constituents which may be present do not interfere with the result. Molybdenum, for instance, which may replace the tungsten does indeed increase the opacity but not nearly to the same extent as tungsten. Its atomic weight is 96 and its opacity six times that of iron.

On the same principle the lead content of glass or the metal content of copper ore may be determined. The fact that in these cases the metals exist in chemical compounds is of no importance as the opacity is a property of the atom itself and does not depend, as in the case of ordinary light, on the form of combination.

The relationship between opacity and atomic weight is not proportional. The determining factor is not the atomic weight but the place number in the natural system of the elements. Except in special cases where selective absorption of the rays takes place, the opacity which is dependent on diffusion is in general proportional to the fourth power of the ordinate number.

Accordingly the greatest opacity is possessed by uranium and thorium, the least among the solids by lithium and beryllium. The latter metal is one which should prove itself extraordinarily useful for many most important physical experiments. It has the advantage over lithium that it is unaffected by air. It is less opaque to both Roentgen and cathode rays than aluminum or even water and such organic substances as rubber and paper. Its physical characteristics at low temperature must be very striking. It would doubtless be profitable to produce this remarkable metal on a somewhat larger scale.

Nature of X-Rays

The author comments briefly on the nature of X-rays. A decade or more elapsed after Roentgen's discovery before Barkla, by succeeding in partial polarization of the ray, proved the transverse nature of these ether waves. He also showed the way to their approximate measurement which is 10,000 times smaller than the waves of visible light. At the same time the difference between the penetrating "hard" rays and the more easily absorbed "soft" rays was shown, like that between violet and red light rays, to consist only in the length of the waves. The hard rays have a short wave length and great frequency, the soft rays greater wave length and slower frequency. Bot are extremely short-waved light.

The greatest step in our knowledge of these rays since 1912 is due to von Laue. His discovery puts at our disposal resources which permit us to penetrate more deeply into the interior of solid bodies than any of the existing methods of metallography.

A well-known means of determining the wave length of light consists in passing a monochrome ray through a lattice of bars placed very close together. The bars deflect the light, which causes to be seen on a screen set up behind the lattice not only the direct effect of the ray, but also a number of reproductions of the same effects deflected to the side. The shorter the wave length of the light to be examined the finer the lattice must be.

To adapt this optical method to the extremely short-waved X-rays would require a lattice finer than could be made by the hand of man. Nature comes to our aid, however. In crystalline structures lattices already exist built up of atoms or molecules, with a constant of 10^{-8}, and it was von Laue's happy idea to use them for the investigation of the rays. These crystal lattices are of a different nature from the Rowland gratings used for spectroscopic measurements. They are not only crossed but consist of a whole system of such crossed gratings placed one behind the other. Laue's discovery was the foundation of a new epoch in crystallography in the midst of which we now are. The art of making the plates has attained a high degree of development and a rich mass of data has been collected.

We await with great interest the result of experiments as yet unfinished on metallic alloy crystals in which the presence of a second kind of atom in the lattice introduces disturbances of the electrons, made manifest in a lessening of the diffraction of the electrons and with it of the electrical conductivity and a change in the mechanical properties, such as increased hardness, etc.

Possibly the investigation by the aid of the X-rays, of materials which play such an important part in industry will throw light on the causes of the principal characteristics. F. E. N.

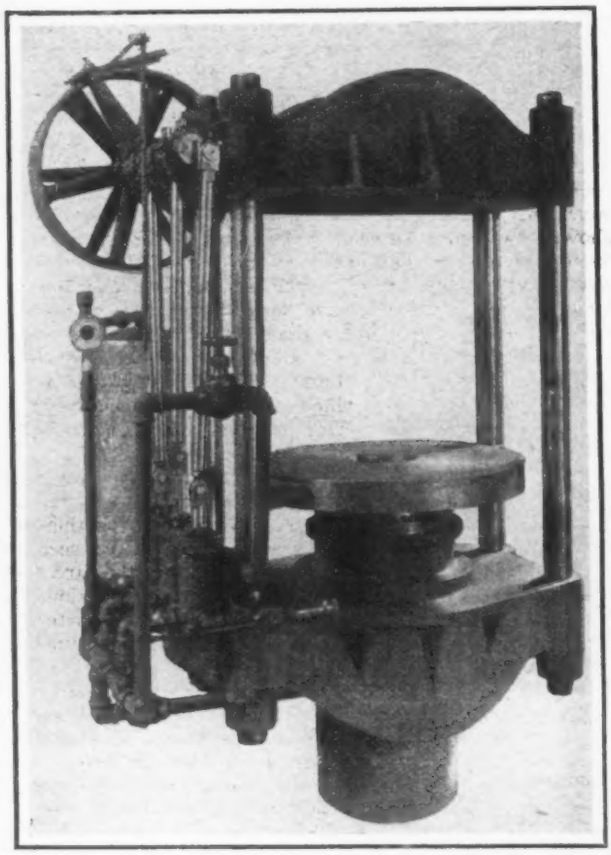
*From Dr. R. Schenck in *Stahl und Eisen*, Oct. 13, 1921.

Business conditions, according to a survey of current business issued by the Department of Commerce, are improving. The preliminary survey for January states that the iron and steel industry is still without definite trend, though activity in certain lines was greater than in December. Although the automobile industry showed the usual seasonal dullness, marked interest was exhibited in the shows, and greater activity in the tire industry gave every prospect of a satisfactory season. Industries depending upon rural purchases have shown little recovery, and cannot be expected to show much until the new crop year. This is particularly true of agricultural implements.

Press for Tires and Other Uses

A new 250-ton hydraulic press designed primarily for forcing solid rubber tires on and off truck wheels, but adaptable also for a variety of other uses, has been brought out by the West Tire Setter Co., Rochester, N. Y.

The fame or resistance pieces are of cast steel. The top platen is of steel, cast solid with the top resistance piece, the bottom platen being also of steel and removable from top of the ram. The area of the



The Distance Between Platens Is 37 In. and Horizontal Distance Between Strain Rods, 43 In.

ram is said to be sufficient to produce the required tonnage with comparatively low initial pressure, thus permitting longer life of valves and other working parts. It is claimed that where this press will use 2000 lb. initial pressure, other designs frequently require 5000 lb. initial pressure.

The pump is of the 3-plunger type with automatic cut out for large plunger and has one 2-in. low-pressure plunger, for throwing a greater volume of oil, to fill pipes and cylinder quickly. When about 200 lb. pressure has been obtained the larger plunger is automatically cut out by a special by-pass valve, leaving the two smaller plungers in operation for completing the higher pressure required for maximum tonnage.

The vertical measurement between platens is 37 in. and the horizontal measurement between strain rods, 43 in. The diameter of the platens is 42 in. and the travel or stroke of ram, 33 in. The bore of the cylinder is 16 in. The height from floor line to top of pulleys is approximately 7 ft. 3 in. and the overall height, approximately 9 ft. 3 in. The strain rods are of 4¼ in. round steel.

New Safety Code for Use in Grinding

A new safety code for the use, care and protection of abrasive wheels has recently been approved by the American Engineering Standards Committee and released for publication, the date of approval being Feb. 11. This code has been in the process of preparation for about two years. It was prepared under the rules of procedure of the American Engineering Standards Committee and has as its sponsors the International Association of Industrial Accident Boards and Commissions and the Grinding Wheel Manufacturers of the United States and Canada. These sponsors appointed a sectional committee to draft the code, consisting of 28 members representing various branches of both Federal and State Governments, several national manufacturing associations, a number of individual employers, associations of employees using grinding wheels, several technical societies, insurance associations and others interested in the manufacture or use of grinding wheels. Dr. L. W. Chaney of the U. S. Bureau of Labor Statistics is chairman and A. Rousseau of the Norton Co., secretary of the sectional committee.

The new code is said to be a distinct improvement over the codes previously issued by the grinding wheel manufacturers, and contains much information not found in any other publication. The size and scope of representation of the organizations sponsoring and endorsing the code give it an air of authority which cannot but commend it to the careful consideration of everyone interested in any way in grinding wheels.

The code is now in the hands of the printer and will be ready for general distribution about the middle of March. Copies can be obtained from any grinding wheel manufacturer on request.

New Inside Micrometer

The Reed Small Tool Works, Worcester, Mass., has placed on the market the inside micrometer caliper shown in the accompanying illustration. The barrel, spindle and thimble have the same diameter as the corresponding parts of the company's outside micrometer, large surfaces allowing for generous sized figures on the barrel and spindle.

A feature of the tool is the detachable handle, easily and quickly adjustable, making it convenient for right or left hand work. Measurements can be made in inaccessible places or the entire length of a cylinder bore can be gaged. With a range of one inch, time

The Detachable Handle Is a Feature

lost, while in actual use, is less than with tools having a smaller range. Extra rods, fitted with anvils, are intended to permit of quick change with little possibility of error. The rods are interchanged by unscrewing from a threaded stud at the end of the barrel and each rod is internally threaded and ground square at the hardened end, which sets squarely against the barrel shoulder. At the point of measurement the rod is fitted with a hardened tool-steel anvil, adjustable for lengthening the rod and compensating for any anvil wear. Anvil faces are ground on a comparatively small radius, making the tool especially adaptable for measuring parallel or curved surfaces.

The Pittsburgh-Des Moines Steel Co. has consolidated its structural and plate sales departments and W. W. Hendrix, who for some time has had charge of plate sales, has been placed in charge of the consolidated division. Mr. Hendrix, who has been with the company for 20 years and is vice-president, now has the title of assistant general manager of sales and sales manager for the Pittsburgh territory.

NO BONUS BILL

Belief in Washington That the Measure Cannot Be Passed at This Session

WASHINGTON, Feb. 21.—Predictions are being freely made in official quarters that there will be no bonus legislation enacted at the present session of Congress. It is apparent that the interminable controversy over this largess to soldiers will be passed on to the next session and the legislation indefinitely postponed. At present there are indications that the House may jam the measure through at the current session purely as a matter of supposed political expediency, realizing that the Senate and the President favor postponement of action.

There is a strong element in the House, manifestly at variance with the Administration, who would like to return to their constituents at the forthcoming fall election as sponsors of a bonus regardless of how the money should be raised. The Administration is insistent that the bill shall include a plan for obtaining the revenue and has recommended a sales tax. The Chief Executive has announced himself in favor of a production tax to be collected at the source because of its so-called simplicity of collection and equitable distribution. The agitation for a retail tax apparently has not impressed the President, for he has expressed the belief that it would be too complicated and would involve more expense in collection than a manufacturer's tax. The President refrained from suggesting the rate which could be levied at the source, but it is said that he would approve a 1 per cent tax on wholesale sales of manufacturers' products. It is estimated that approximately $350,000,000 could be obtained annually from this source and this would be sufficient to meet the demands of a cash bonus plan.

The agricultural bloc in Congress is strongly opposed to the sales tax plan. It is supported in this view by the American Federation of Labor. Business interests of the country, as Congress is well aware, are opposed to any kind of bonus legislation because of its serious economic effects. The attitude of agricultural interests is reflected by the statement of T. C. Atkeson, representative of the National Grange, in a formal statement to Congress. He said "The Grange is opposed to the introduction of the new principle of taxation variously known as sales tax, consumption tax, manufacturers' tax or turnover tax in any form and by any name, and considers the effort to enact it into law indefensible, wrong in principle and designed to shift the burden of taxation from those most able to pay, and receiving the greatest benefits to the shoulders of those least able to pay, and receiving the least benefit from the Government. The National Grange has suggested an excess profits tax for the bonus." He pointed out that, should this be inexpedient, a tax should be levied which will not be added to the cost of living of the millions with limited incomes. The President is unalterably opposed to the restoration of the excess profits tax, which proved so burdensome to business and industry. It is generally conceded that a levy on manufacturers' products could not be added to prices paid by ultimate consumers. Business men feel that it is not feasible to raise prices at this time. They also realize that they are the first to feel the effects of extra pressure from taxation in diminution of profits and would undoubtedly be compelled to absorb this assessment through narrowing of the margin of profits. Judging from the volume of protests received by Congress from business interests it is evident they are convinced that the study of the economic effects of a bonus by the legislators is exceedingly superficial and that the political side only has been considered.

January Fabricated Steel Business Relatively Good

In January 72,100 tons of fabricated structural steel work was contracted for throughout the United States, against 71,500 tons in December and 63,000 tons the monthly average for 1921. In January, 1921, the total was only 32,000 tons, but in January, 1920, it was 135,000 tons. Taking into account the hesitation evident in consummating investment enterprises, the fact that January is slightly better in tonnage than December may be significant. In the last ten years January has always shown a falling off from December with two exceptions, 1913 and 1914. January bookings for a decade have averaged 82,800 tons, while December bookings have averaged 111,200 tons. Thus January is about 15 per cent better than the 1921 rate and not quite 13 per cent under the January rate. February has normally been 10 per cent better than January.

The statistics of the volume of business taken by the bridge and structural shops of the country are those of George E. Gifford, secretary of the Bridge Builders and Structural Society, 50 Church Street, New York. The January business indicates that 40 per cent of shop capacity was covered, the total monthly capacity being put at 180,000 tons.

Improvement in Michigan Foundries

BATTLE CREEK, MICH., Feb. 20.—Considerable improvement in the business of Michigan foundries was reported at the quarterly gathering of the Michigan Foundrymen's Association, held last week in Battle Creek. A. W. Blodgett, secretary of the organization, made the report to that effect.

Mr. Blodgett stated that at one time during the summer of 1921 business had dropped as low as 20 per cent of normal, but that at the present time it is 35 per cent of normal.

S. T. Plimpton, Cleveland, led a discussion on the subject of the "Universal Iron Contract." It is a uniform iron purchasing contract designed for use between the foundry and the furnace companies and which has been drawn up and submitted by the National Association of Purchasing Agents.

Other matters discussed were a uniform cost accounting contract and the important research work that is now being done by the University of Michigan along lines of particular interest to the iron industry.

Reorganization of Commonwealth Fuel Co.

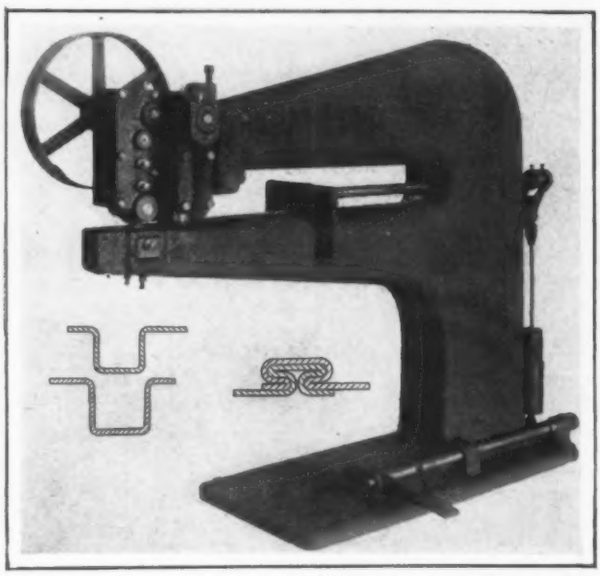
PITTSBURGH, Feb. 21.—Announcement is made of a reorganization and an increase in the capitalization in the Commonwealth Fuel Co., principal offices of which are in the Oliver building, Pittsburgh, with branch offices in Philadelphia, New York and Clarksburg and Morgantown, W. Va., a result of which is that W. G. Ireland, for the past 10 years sales manager the Jamison Coal & Coke Co., Pittsburgh, becomes financially interested in the company and has been elected its vice-president. The Commonwealth Fuel Co., which was incorporated and began business in 1913, owns and operates a mine in the Fairmont, W. Va., district and acts as sales agent for several bituminous operations, including the Simpson Creek Coal Co., and the Maryland Coal Co., with properties in West Virginia. George Paull, president of the Commonwealth Fuel Co., is a director in those companies. The company will continue to conduct a general brokerage business in coal and coke and will handle sales in this district of foundry coke produced from coal from the Jamison mines in the Greensburg basin, recently taken over by the Keystone Coal and Coke Co. Officers of the Commonwealth Fuel Co., in addition to Mr. Paull and Mr. Ireland are J. P. Fife, secretary and J. H. Roelofe treasurer. Robert Dickey is sales manager.

The Danbury Mill Supply Co., Inc., 37 Liberty Street, Danbury, Conn., which was recently incorporated to deal in mill supplies, machinery, etc., has chosen the following officers: President, George A. Seagrave; secretary and treasurer, Winfield S. Holman, who is in the plumbing and heating business in Danbury.

Compound Seam Closer

A machine for producing a side seam tighter and more substantial than the single lock seam has been developed recently by the Niagara Machine & Tool Works, Buffalo. It is shown in the accompanying illustration and is known as the No. 42 compound seam closer.

The seam produced by the machine can be filled with sealing compound to make it air tight, although the seam is said to be practically air tight without the filling. Calcium-carbide drums and calcium-chloride cans are examples of containers requiring air-tight



Offsets Are Formed in Double Crank Press and the Sheet Rolled to a Cylinder and Placed Over the Horn

seams and the machine is especially adapted for this class of work.

The offsets shown in the left hand insert are formed by dies in a double crank press. The sheet is then rolled to a cylinder and placed over the horn of the seam closer, with the offsets laid on the guide piece set into top of horn. The machine runs continuously and therefore does not require tight and loose pulleys or a clutch. By depressing the treadle connected to the silding gage, the work is moved forward along the horn, and fed between the first set of rolls, which squeeze the seam together at the bottom. After these rolls take hold, the body feeds automatically through the machine. The next set of rolls flatten and thereby close in one operation the double-lock seam, shown in the right hand insert.

The machine weighs approximately 2700 lb. The pulley is 20 in. in diameter, 3 in. face and is run at 100 r.p.m. The maximum length of work that can be seamed is 42 in., the minimum diameter of the longest work being 13½ in. Shorter diameters, for work of short length, can be seamed. The capacity is given as No. 22 gage soft steel and lighter.

Patent Office Bill Now a Law

WASHINGTON, Feb. 21.—President Harding last Saturday signed the Lampert patent office bill. Now that the measure has become a law, much to the gratification of industrial, engineering and other interests of the country, salaries in the patent office will be increased, and the force of examiners and other employees expanded in order to relieve the congestion of work. The measure also is expected to check the resignations of experts, who as is well known, receive totally inadequate salaries.

The bill passed the Senate last week, after having been previously passed in the House, without any opposition and in the exact form in which it came to the Senate. It was in charge of Senator Johnson, chairman of the Committee on Patents.

"Familiarity with the patent office demonstrates the necessity of the bill," said Senator Johnson. "Increase in business has been so disproportionate to aid accorded the office that it has fallen far behind. The receipts of the office are sufficient to justify additional expenditure and make unnecessary draft on the treasury."

St. Louis Companies Merged

The Hagen Metal Products Co., 119-127 Bowen Street, St. Louis, and the Western Screw-Products Co., 3219-25 South Broadway, St. Louis, have been merged. The combined interests are capitalized at $125,000, and business will be conducted in the name of the Western Screw-Products Co., which is the older of the two companies.

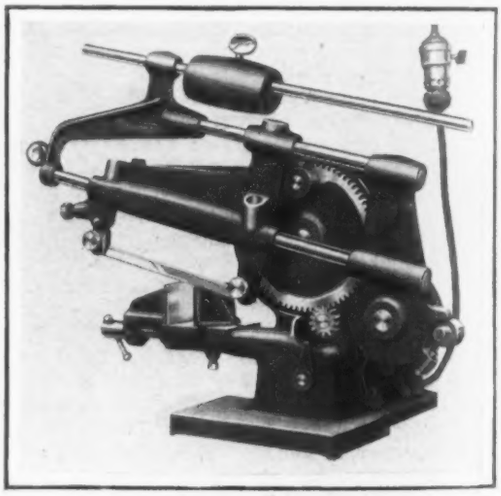
Jos. J. Hagen, president Hagen Metal Products Co., since its organization in Detroit in 1919, and who was secretary and treasurer of the Western Screw-Products Co., prior to that time, has assumed the management of the combined interests.

The company specializes in screw machine products, cap screws, plain and castle nuts and light metal stampings. The officers of the Western Screw-Products Co., are as follows: Jos. J. Hagen, president; Jno. T. Soy, vice-president; Herman Giesecke, secretary and treasurer.

Portable Power Hack Saw

The bench hack saw shown in the accompanying illustration has been placed on the market recently by the Edlund Machinery Co., Inc., Cortland, N. Y.

The machine is of the portable type, intended to eliminate the labor of hand sawing and to handle a large share of the work usually done on larger machines. It cuts tool and machinery steel efficiently



Cutting Is Done on the Backward Stroke

and is especially adaptable for use in tool rooms and machine shops.

Power is supplied by a small motor, direct connected, the power being transmitted through cut gearing. The machine can be attached to any electric light socket. The cutting is done on the backward stroke, the saw blade being relieved automatically on the forward stroke, an arrangement intended to diminish the wear and prolong the life of the blade. The feed is regulated by a weight, which can be instantly adjusted for various cuts and sizes of work from the lightest tubing to the heaviest bars.

The saw arm when raised for placing the work is held automatically in position until released by the operator. The machine also stops automatically when the cut is finished and can be stopped or started at any time while the cut is being made. Any standard 8-in. blade can be used and the blades can be easily replaced without the use of tools.

CONTENTS

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Steel Production Costs

It is common knowledge that many of the steel mills have been losing money in the past few months, but the remarkable thing is that the losses are not greater. The losses are chiefly of overhead, i. e., a mill fails to earn all its overhead expense, but if it were idle, it would have an overhead nevertheless. There are, of course, losses in depreciation of inventory, but those are caused by extraneous conditions and are not chargeable to operation.

Speaking generally, comparisons of selling prices lately ruling with prices obtaining before the war and in the early months of the war, with allowance for known and inescapable increases in various items of cost, such as freight rates and wage rates, indicate that in some respects steel is being produced more economically than before the period of inflation, or the losses would be larger than are being reported.

There are two expensive factors in present operating conditions whose influence is not commonly appreciated, the low operating rate and the very mixed character of the specifications being filled. Before the war, it was considered almost impossible, from the profit and loss standpoint, to operate the average mill at less than about half its capacity, but of late many mills have had to contend with a much worse operating rate than that.

The other condition, the mixed specifications that have to be filled, is well understood by all who have any familiarity with mill operations, but is given little thought by the average buyer of mill products. It is the natural and unavoidable consequence of the hand-to-mouth buying, on the most conservative scale, that has characterized the market for months past. The buyer is unwilling to wait for delivery until a convenient and economical rolling schedule can be made up, but insists on immediate attention, and if one producer will not agree to almost instant rolling another producer will. In all the ups and downs of the steel market in the past, managers have noticed the sudden increase in costs that comes when orders run short, and the sudden drop in costs that occurs when it becomes possible to schedule mills a little distance in advance.

With the various handicaps existing, the showing of efficiency and economy made by the mills is noteworthy. In many respects, perhaps minor individually, but important in the aggregate, steel mills are undoubtedly being operated more efficiently than before the war. The efficiency of labor is not excluded as an item in this connection, for there are cases in which a direct comparison can be made between results in 1913 and results to-day, showing a greater labor efficiency at the present time.

Further decreases in costs and increases in efficiency are to be expected, although there can be no sudden improvement except such as may come from enlarged operation and better scheduling of rollings. No further general reduction in wages seems at all probable in the near future, although there may be readjustments in spots. The "general freight rate reduction" that used to be looked upon as a certainty, the time only being in doubt, now seems likely to come rather gradually.

Some reductions may occur of such character as to be considered more or less "general," but, if so, they will not be large. If the rate makers consider this matter with an eye to the traffic producing possibilities of reductions, they may well turn their attention to iron and steel scrap rates, which are in many cases too high to permit scrap to move. Scrap dealers point out that there are piles of scrap that can be looked at, ocular evidence that traffic movement can be developed. The holders can afford to wait, for the interest cost of holding is practically nothing.

Steel prices are now so low, considering all conditions, that no decreases in production costs are likely to appear in recognizable form in changes in selling prices. Steel prices are not fixed, but they are as nearly stabilized as can possibly be expected in the circumstances.

One of the striking effects of the steel depression of 1921 has been the decline in the output of electric furnaces making steel ingots. It has been out of all proportion to that in either open-hearth or Bessemer steel. The slump in the

electric ingot output began in August, 1920. In December, 1921, the production was less than half that of January of the same year or 1539 tons contrasted with 3629 tons. In January, this year, it fell still further to only 822 tons, which compares with 10,687 tons in January, 1920. While the open-hearth output last year was about 50 per cent less than that of 1920, the electric steel ingot production was hardly one-sixth of that of 1920. Compared with 1913, when the American electric steel industry was in its infancy, the present rate of operations is less than it was then and, in proportion to capacity, it is less than the Canadian production.

Changes in European Steel Industry

Several captains of the American steel industry have made trips to Europe, but none has brought back a more comprehensive or interesting analysis of conditions in the European steel industry outside of France, than the one published as an interview in THE IRON AGE of Feb. 16.

Two significant facts stand out from the result of the intimate talks of this traveler with nearly 300 steel men of Europe. In Germany the 48-hour week, and in Holland and Belgium the 45-hour week, legally prevail. In those countries, as well as in England, the 8-hour day prevails throughout the steel industry, even in the operation of blast furnaces and open-hearths, with three 8-hour shifts. The conviction prevails everywhere that labor conditions and wages will not return to the pre-war levels, but that a new era is dawning.

The other fact is a corollary of the first. It being admitted that labor is to be more expensive than before the war, European steel men, in order to compete with each other and with America, must lower costs by the modernization of equipment and the adoption of every possible labor saving device. Larger blast furnace units and improved open-hearth and rolling mill equipment are being widely discussed and in some cases planned. Even the ancient conservatism of British pig iron makers has collapsed and they confess that a change is necessary. Conditions generally in those countries are pointed to as paralleling those in the United States before the war and as likely to remain so. These industries, therefore, face new conditions in the future.

With taxes high and likely to be so for some time to come, with labor more expensive and on a changed basis, with transportation and fuel charges high and with economic and metallurgical conditions radically changed both in Germany and England, those industries are sure to develop along new lines with the ultimate result of larger capacity units and labor saving devices. The effect on the American steel industry cannot now be measured, but the competitive conditions of 1913 and 1914 have disappeared. The introduction of the 8-hour day in those steel industries may have its bearing on the American and perhaps cause its introduction here. In any event the progress of these changes will command the careful attention of American iron and steel makers.

Two pertinent facts characterize the copper export movement in 1921. Sales to foreign consumers were the largest for any year since the war, exceeding both 1920 and 1919 by a liberal margin, and they were over 60 per cent of the 1913 exports. In a year of acute depression and light exports in all other products of the American steel and metal industries, this record is noteworthy. The other striking fact is the heavy purchases by Germany of American copper last year. According to official data just made public, German purchases were not only the largest of any other country, but they were in excess of those of France, Great Britain and Japan combined. German consumers bought about 39 per cent of the total exports and, if Holland's receipts be credited to Germany, this amount would constitute over 44 per cent of the total. Before the war, or in 1913, Germany took only 33 per cent of American copper exports, largely, as a preparation for war. The renewed movement reflects not only the acute need of copper in Germany, but is an example of what a country can do under the handicap of a depreciated currency.

Progress in Steel Welding

That rapid strides have been made in the fundamental principles of welding metals, so that the practice is more of a science than an art, is clearly an inference from an article in THE IRON AGE last week on welding rods. In the early stages of welding steel and even up to recently, the practice consisted too often in filling a steel weld with whatever rod was ready at hand. This often resulted in poor or weak welds and in a prejudice against the art in general.

Much research has been conducted recently both on the correct mixture of gases and the proper distribution to attain controllable temperatures as well as on the kind and composition of the rod which is to supply the welding metal. Attention has also been paid to the use of proper fluxes as well as to the needs in obtaining a high grade weld, of being certain that the base metal and the welding rod are fused at the proper temperature to insure a thorough mingling of the metals. It has been conclusively demonstrated that to obtain a weld as good or better than the original metal it is necessary to use a rod of a composition which will produce a joint better than the original or base metal. To attain this rods of various compositions, including nickel steel, manganese steel and other alloys, have been developed. Their judicious use in the hands of experts is producing results hitherto unexpected.

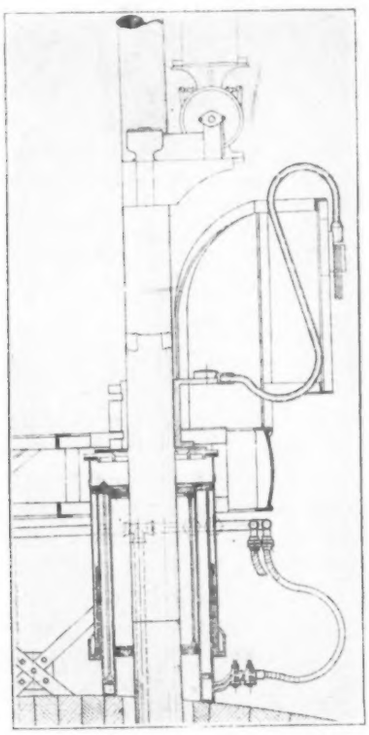
It may safely be said that the art of welding has developed to a stage where, by controlling the temperatures, the materials and the fluxes, furnace conditions originally existing in the actual manufacture of the metal are imitated as nearly as possible at the welding point, to the decided improvement of the welded portions. Reinforced by modern practice and apparatus in heat treatment as well as by new magnetic devices, already in use or in prospect, for testing the reliability of welds, it is probable that still more advances may be looked for, not only in steel but in brass, copper and other non-ferrous metals.

CORRESPONDENCE

Joint for Electric Furnace Electrodes

TO THE EDITOR: Mr. Moore in his very interesting report on the present development of the electric furnaces, (THE IRON AGE, Sept. 22, 1921) emphasizes very intelligently the great importance which should be given to the furnace heat losses.

In most cases the heat loss is increased due to the poor joint between the furnace frame and the electrodes. Few electric furnaces on the market possess such a tight joint at the electrodes as to prevent air flowing through, especially when the furnace is pouring. This air current not only cools off the furnace interior, but causes injury to the electrodes.



Section of Electric Furnace Electrode Holder to Indicate Scheme to Secure Air Tightness of Joint

Mr. Moore gives as an example the Stobie electric furnaces (England) which has an improved electrode joint, but I think that the Fiat electric furnace has solved this problem by the use of a patented device which was developed after many years of study and experience. By using this device on six Fiat furnaces of 5 and 6 tons capacity in our foundries at Turin, we saved 650 kw. hr. of power and 3 kg. of electrodes per ton of steel, and with the furnaces cool at the start. This device gave so tight a joint that the efficiency of the furnace was greatly increased and the use of a larger electric current and electrodes was made possible. Another saving was made in extending the life of the refractory furnace lining which was destroyed often before the adoption of this device.

This device is protected in the United States by patent No. 1,320,884, Nov. 4, 1919, and by other patents throughout the world.

Fig. 1 shows a transversal section of a 5-ton Fiat furnace and the general design and assembly of this joint device. A steel bridge mounted on the sides of the furnace, supports the three electrode housings which are made out of a cooled steel cylinder. Inside of the cylinder a series of insulated rings acts as guides to the graphite electrodes and prevents it coming in contact with the metal wall of the cylinder. At the top of the cylinder a large asbestos disk is fixed, supported by a metal ring, over which is placed a bell shaped flange attached to the external steel covering. An opening is made at the center of this covering to allow the electrode to pass through. The current terminals for the electrodes are attached to the top of this covering by means of insulated disk and bolts. The movement of this covering is made by two bolts on the side and the electrodes are adjusted by a combination of gears driven by a small electric motor. This motor is operated by a drum controller located on the switchboard.

All parts of this device are accessible to be cleaned or inspected. The entire outfit forms a completed unit which can easily be placed or removed from the furnace by a small hoist.

This device can be attached to almost any type of electric furnace and will shortly pay for itself. With our 6-ton furnaces, manually charged, we can do nine charges in 24 hr. operation.

The Fiat electric furnace works are at the present time using electric furnaces of 5 to 20 tons capacity in their foundry shops. Knowing the results obtained from all the furnaces equipped with this Fiat joint device here in Italy, especially in the steel car wheel industry, which is rapidly progressing. I thought the readers of THE IRON AGE would be interested.

DR. ALFREDO STROMBOLI.
General Commercial Manager of the Fiat Electric Furnaces.
Turin, Italy.

Warwick Furnace Characteristics

To the Editor: My attention has been called to the article in your issue of Feb. 2, relating to the Warwick furnaces, and to certain statements made therein. The Warwick No. 2 furnace plant was built under the designs and supervision of my firm; furthermore, my firm had been the engineers for the Warwick Iron Co. for several years prior to the construction of No. 2 furnace. It may, therefore, be safely assumed that I am familiar with the conditions that controlled the design of the furnace lines adopted in both the old and the No. 2 furnace.

It is faint praise, indeed, to state that a man of the initiative and scientific attainments of Edgar S. Cook determined the lines of No. 2 furnace by a "proportionate enlargement of those of the older stack," as stated in the article; furthermore, such a statement is incorrect. The lines adopted for No. 2 furnace were the result of many conferences on the part of Mr. Cook and myself, in which the operating result of several furnaces 100 ft. in height were carefully considered and analyzed.

At that time six 100-ft. furnaces designed by my firm were in use, and the results of their operation were at our disposal; i. e., No. 3 Lebanon (the first furnace 100 ft. in height built in the east), Nos. 1 and 2 Lorain, Nos. 2, 3 and 4 Jones & Laughlin Eliza Furnaces. The lines adopted for Warwick No. 2 furnace were as follows: hearth 14 ft., bosh 21 ft. (not 22 ft., as given in the article); angle of bosh 72 deg., stock line 14 ft. and height 100 ft. On the other hand, the lines of the old Warwick furnace were of the following dimensions: hearth 10 ft.; bosh 16 ft., 4 in.; angle of bosh 74½ deg.; stock line 11 ft. and height 70 ft.

It is, of course, difficult to realize, under present conditions of furnace practice, that Mr. Cook's proposal to make 500 tons of foundry iron per day, in one furnace, was regarded as impossible by most blast furnace managers. Progress and initiative, however, were among Mr. Cook's ruling characteristics, and modern furnace practice is indebted to him in many particulars. Contrary to the statement contained in the article in question, the lines adopted did give expected results, and no difficulties were encountered other than those prevalent at modern furnaces, during that transition period in furnace practice.

The furnace was blown in Oct. 8, 1901, and no changes whatever were made in the lines or plant, until the furnace was blown out for relining in 1904,

when the following lines were adopted: hearth 15 ft., bosh 22 ft., angle of bosh 75 deg. and stock line 15 ft. In the relining of 1907 the lines were changed to provide the following: hearth 15 ft. 6 in.; bosh 22 ft. 6 in.; angle of bosh 75 deg. and stock line 15 ft. In the relining of 1911, the lines of 1907 were repeated, except that the bosh and stock lines were made 23 ft. 6 in. and 16 ft., respectively. Mr. Cook's active participation in the management ceased in 1912. At no time has the furnace been blown out except for the replacement of wornout linings.

It is an interesting fact that, except for relining periods, No. 2 furnace plant has been in continuous operation since it was first placed in blast in 1901, and further, that the original linings of the firebrick stoves are still in use.

I do not have the latest figures at my disposal, but from Oct. 8, 1901, to Dec. 1, 1920, Warwick No. 2 furnace had produced 2,663,257 gross tons of pig iron. When the depression of 1920 developed, No. 2 furnace was continued in blast and is at the present time in blast, whereas the new furnace described in the article was blown out in December, 1920, after about four months' operation, and is still out of service.

Reference is made in the article to the replacement of the Hugh Kennedy stoves at the old furnace by "those of larger dimensions and of a center combustion type;" it may be well to add that the latter stoves are of my three-pass design and are built under my patent. FRANK C. ROBERTS, C. E.

Real Estate Trust Building,
Philadelphia, Feb. 9.

Scrap Dealers Ask for Lower Freight Rates

WASHINGTON, Feb. 20.—Iron and steel scrap dealers appeared to-day before the Interstate Commerce Commission in connection with the general rate investigation and asked that the 40 per cent advance in freight charges made in August, 1920, be removed. This is the same request as was made by most iron and steel manufacturers when the hearing was opened.

H. F. Masman, traffic manager for the National Association of Waste Material Dealers, who asked reductions of rates in all kinds of so-called waste materials, said that scrap iron and steel should take the pig iron rate instead of the billet rate as both are raw materials used in the production of steel.

J. L. Low, manager of the freight department of Briggs & Turivas, Chicago, submitted exhibits to show pig iron rates are lower than scrap iron and steel rates, but conceded that the carriers had made some adjustments recently. He asked for removal of the alleged discrimination in rates against scrap and then elimination of the general 40 per cent advance.

It was said that practically no scrap is moving from Eastern points to the central district, because of high rates, and that the business is demoralized because 70 per cent of the scrap used at Youngstown must move from distant points.

A. B. Alpirin, an Omaha scrap dealer, asked for specific reductions in rates from Omaha to Chicago, St. Louis, Kansas City, Denver and Peoria, Ill., ranging from 20 to 50 per cent. He said that 60 per cent of the scrap dealers in the small cities of Nebraska are out of business.

A jury in Pittsburgh pared $265,318 from the claim made by the Crucible Steel Co. of America against the city of Pittsburgh for damages sustained to its property fronting on West Carson Street as a result of widening that thoroughfare and raising it from the flood level. The company asked $292,318 but the jury awarded it only $27,000.

The Richardson & Boynton Co., Dover, N. J., manufacturer of stoves, ranges, etc., is arranging to transfer a number of local plant departments to its works at Buffalo, N. Y., including molding, tin and sheet metal operations. The change is being made owing to continuance of local labor troubles.

Belgium's production of spelter in December, 1921, is reported to have aggregated 7370 metric tons.

DISTRIBUTION OF OVERHEAD

Industrial Cost Association Considers Merits of Productive Hour and Machine Rate Method

A paper on "Overhead Distribution Methods" was presented at the Feb. 16 meeting of the New York section of the Industrial Cost Association at Keen's Chop House, New York, by F. Brugger of the Pittsfield works of the General Electric Co. The discussion following centered chiefly upon the relative merits of the productive hour method and the machine hour rate method of figuring costs.

In defense of the machine hour rate method in a modified form, a representative of the De Laval Separator Co. explained how that company had, after investigation of both methods, introduced a greatly modified machine hour rate method, with what, up to the present, appears to be satisfactory results. In a department of 70 machines, large and small, operating on different kinds of work and on which, by way of illustration, about $2 per hr. was formerly charged as overhead, under the new method of figuring, an overhead on the smaller machines of 30 cents to 40 cents per hr. was shown, and up to as high as $5 per hr. on the larger machinery. As a result the company began to consider the advisability in some cases of turning certain of this larger work over to other shops.

The questions of tax, insurance, light, heat and power charges were discussed and the proper methods of charging these items, as well as the value of charging interest on the investment in a machine against overhead, as part of the operating expense.

There was some disagreement over the proper method of figuring overhead in dull and active business years, Mr. Brugger preferring the establishment of a normal overhead, to be evenly distributed over dull and active periods, arguing that business activity and depression occurred in cycles and should be so considered. Those in opposition pointed out that there was no good reason for making a period of two or three years prosperity pay the overhead run up by one year of depression.

The board of directors for the coming year was unanimously elected, the board being vested with authority to elect the officers of the organization. The elections to the board were as follows: H. D. Starr, assistant comptroller New Jersey Zinc Co.; C. A. Porter, comptroller Hardinge Co., New York; J. H. Ramsey, auditor Electro-Dynamic Co., Bayonne, N. J.; Addison Bonen, Yale & Towne Mfg. Co., Stamford, Conn.; R. W. Matter, office manager Jenkins Mfg. Co., Bloomfield, N. J.; F. B. Van Vleet, general auditor Ruberoid Co., New York; Durlyn Wade, Jr., general auditor Cross, Austin & Ireland Lumber Co., Brooklyn, N. Y.

Midvale Shuts Down Munition Departments

The armor plate, gun and projectile departments of the Nicetown works of the Midvale Steel & Ordnance Co. have been shut down, following the recent action of the Conference on Limitation of Armament in restricting the naval building programs of the United States and other countries. About 400 men were thrown out of employment.

No plans have been announced as to the use to which the idle departments may eventually be put.

The Niles Steel Products Co., Niles, Ohio, formerly the Allsteel Supply Co., has developed the production of stampings and pressed metal parts. It is located very advantageously in the Mahoning Valley for its source of supply, being surrounded by sheet, plate and strip mills. Besides its regular factory building, it has, in the past year, added a warehouse and office building. It has a completely equipped machine shop of sufficient size to supply and maintain dies for its press department. It also has a well developed department to furnish agricultural implement seats and other stampings used by implement manufacturers.

Opposition to Foreign Valuation Plan

Action of Senate Committee Members Not Favorably Regarded by Iron Trade—Arguments Presented by John A. Topping for American Valuation

BY L. W. MOFFETT

WASHINGTON, Feb. 21.—The iron and steel trade being on record in favor of the American valuation plan as a principle for basing tariff duties will applaud the steadfast opposition of Chairman Fordney of the House Ways and Means Committee to the foreign valuation plan, which, to the disappointment of the trade and American manufacturing interests generally, has been tentatively agreed upon by the Republicans of the Senate Committee on Finance. Mr. Fordney has made the flat statement that if the Senate sends the permanent tariff bill over to the House based on foreign valuation, that branch of Congress "may expect that it will be sent to the Ways and Means Committee, which will send back to the Senate a bill based on American valuation." Mr. Fordney added that he would "never agree to any foreign valuation and I do not know of any Republican member of the House who will or who wants foreign valuation."

This situation plainly opens a breach. Its outcome is purely problematical. It may greatly delay enactment of tariff legislation, which already has been deferred by the Finance Committee to a point where the manufacturing interests of the country have become irritated. There are even those who have no restraint in saying that the Senate Committee is purposely trying to delay tariff legislation further in the hope that the dilemma it has faced over the valuation feature will be worked out through some sort of adjustment of world-wide economic conditions. At the same time, the Republicans, who are responsible for legislation, undoubtedly would have fears of political results if they postponed tariff legislation when their platform has pledged them to tariff revision. It is clear that the Republicans fear the possible political effect if action is deferred much longer. A way out of the situation may not be found unless the President goes definitely on record in favor of some tariff valuation plan. Those in favor of the American valuation plan do not accept the statement that the Senate committee's present attitude can be logically based on any suggestion made by the President. The President, in his annual message to Congress last December in speaking of the American valuation plan, said there could not be ignored "the danger of such valuation making American tariffs prohibitive." Republicans of the House assert that this statement by no means condemns the American valuation plan and does not justify the action of the Finance Committee. On the contrary, they say the reasoning of the President is perfectly sound and simply was a warning against the danger of fixing duties too high. Manifestly a given ad valorem duty is more highly protective under the American valuation plan than it is under the foreign valuation plan. This difference obviously is due to the exchange situation and, according to House Republicans, was taken into consideration when they passed the American valuation plan.

Urged Moderate Duties

Iron and steel manufacturers in substance have expressed the same sentiment as that of the President and have consistently urged only moderate duties based on the American valuation plan. Unless it is finally adopted, they point out that higher duties than those carried in the House bill will be necessary as a measure of protection. This is one of the contentions made in a brief recently filed with the Finance Committe by Chairman John A. Topping of the Republic Iron & Steel Co., on behalf of the independent steel industry in which he asked that the American valuation plan be adopted. His brief was in reply to arguments made against the American plan and supplemented previous statements he and other steel producers have made before both the Ways and Means and Finance Committees.

The Smoot Amendments

The tentative plan of the Senate Committee is based on amendments prepared by Senator Smoot, which Republicans of that committee maintain are designed to meet disturbed economic conditions of the world with the resulting depreciation of foreign exchange. They take into account proclaimed American valuation, flexible rates that might be moved up a maximum or down a minimum of 50 per cent and depreciated foreign exchange as well as provisions intended to prevent discrimination against American exports. Final action on the Smoot provisions is being withheld until an opinion is received from the State Department as to whether the American valuation plan and the depreciated exchange provisions would be in violation of "most favored nation" clauses of existing commercial treaties. Those favoring the American valuation plan plainly do not take much stock in the claim that it would violate such treaties and have pointed out that countries throughout the world have had no hesitancy in erecting high tariffs such as this country has not contemplated.

They also say that granting that there is any substance to the argument about the violation of the treaties mentioned, the Senate Committee has been slow to raise the point. They also are unable to reconcile the attitude of the Finance Committee with the fact that it had employed a staff of experts under the direction of James B. Reynolds to investigate the practicability of the American valuation plan, and despite the attitude of Mr. Reynolds that it is practicable, has for the present at least suggested the foreign valuation plan. The report of Mr. Reynolds has never been made public, but in a brief statement at the recent convention in Washington of the National Association of Manufacturers, who went on record in favor of the American valuation plan, he made the statement that the plan is workable. Critics of the Senate Finance Committee also have commented on the fact that it at one time had practically determined upon this system and was engaged in transferring many duties from an ad valorem to a specific basis. Then also, it is pointed out, it had been about concluded to base duties on the American wholesale selling price. The present shift consequently has aroused real interest, to say the least, but apparently the Republican members of the Finance Committee think it is the logical step to take and work now is under way of returning many duties, it is said, from a specific to an ad valorem basis. There has been a difference of opinion on the plan of duty assessment among officials of the Treasury Department as well as among members of the Tariff Commission. The final solution determined upon necessarily is being awaited with anxiety and even more concern is being shown over the outcome of the difference between the House Republicans and the Republicans of the Committee on Finance.

Mr. Topping's Brief

In his brief filed recently with the Finance Committee, Mr. Topping said that unless the American valuation plan is adopted rates of duty on iron and steel products will have to be greatly increased. He contended that the American valuation plan is necessary even to rates on iron and steel articles which take specific duties. He explains that the value of iron and steel determines in many cases the classification under which duty is assessed and to prevent undervaluation

or fraudulent methods, American valuation is necessary for protection. Furthermore, he states, there are important iron and steel rates rated on the ad valorem basis which selling methods long in vogue require should be continued and these special products, it is pointed out, are exposed.

The brief of Mr. Topping, in part, says:

It has been stated before the Senate Finance Committee by a representative of the Fair Tariff League, that the method of American valuation proposed, results in tariff discrimination, because cost varies with the country of production, and therefore, the exporting country with the minimum cost, would pay a lower rate of duty than the exporting country with the maximum cost. This may be admitted, but this objection would be also true of foreign valuations, because cost variations are not leveled by any method we might adopt in valuing importations.

American valuation, on the other hand, has the distinct merit of not being discrimnatory, as all exporting countries would pay the same amount of duty, and therefore, no discrimination is practiced, whereas discrimination is unavoidable under foreign values, as the amount of duty varies with the cost of the product.

The administrative features of the American plan are practical, and can be easily operated. It has been demonstrated, that it is easier to obtain necessary data at home for appraising commodities, than it is to obtain data of a reliable character, in foreign countries. In fact, under the present law, which permits of duty being levied upon American values, when no other method for determining values is obtainable, emphasizes the fact that American values are always obtainable, whereas experience shows, this is not true of foreign values.

American valuation will not increase the price to the American consumer, but will prevent under-valuations. Under-valuations principally benefit the exporting country and the importing agent, because the imported product is sold, like domestic products, on the basis of what competition, from time to time, suggests, rather than by what the cost of the product justifies. It is, therefore, more important to prevent under-valuation to conserve Government revenues, and to prevent the uncertainties and inequalities arising from depreciated and fluctuating currency values, than it is to legislate to support a theory with doubtful advantages to the consumer, particularly when there can be no doubt that every dollar of imported product brought into our markets, means less work for our people.

Assessment of duty on foreign valuations, converted into United States money at prevailing low rates of exchange, is now enabling foreign manufacturers to displace American products at the expense of American workmen. Unemployment is destroying the purchasing power of the people, and unless this situation is remedied, it will eventually prostrate all American industries which are exposed to this unfair competition.

BASING POINT HEARING

Sessions at Milwaukee Ended—Investigation to Be Continued This Week at Washington

MILWAUKEE, WIS., Feb. 20.—The first hearing of the series ordered held by the Federal Trade Commission upon its complaint against the United States Steel Corporation, seeking the abolition of the Pittsburgh basing point practice because of the alleged discriminatory effect upon Western rolled steel consumers, was brought to an end on Saturday, at the close of the third week of trial sessions opened Jan. 30 in the Government building at Milwaukee by Examiner John W. Bennett.

It was announced that the commission will open the second of the series of hearings on March 1 at Minneapolis.

In the meantime, however, the commission will conduct a hearing at its headquarters in Washington upon the results of the investigation in Milwaukee. Questions concerning the admissibility of evidence will be definitely decided and decisions made upon a large number of motions and objections made by counsel for the commission as well as the Steel Corporation during the hearing at Milwaukee, which during the introduction of testimony were merely noted by the trial examiner for future determination. The decisions upon these questions are expected to have an important effect upon the large mass of evidence recorded thus far, and upon the conduct of future hearings.

Points in Controversy

W. W. Corlett, general solicitor of the Steel Corporation, entered motions at the final session of the hearing in Milwaukee on Saturday, indicating that the points of evidence in controversy will be taken up under four separate headings at the hearing before the entire commission in Washington this week. These are as follows:

1. The introduction of contracts, invoices and correspondence with manufacturers of rolled steel material other than those between the respondent, namely, the U. S. Steel Corporation, and its subsidiary corporations, and concerns whose officials and representatives have testified.

2. The limitation upon cross-examination of inquiry into the (a) profits made upon any article manufactured, and the (b) profits as a whole made by any concern, its increase in net assets, the amounts of dividends paid, and any other facts tending to show the state of prosperity of the concern.

3. The introduction of testimony intended to show a higher cost to the ultimate consumer, or in other words, "the public interest."

4. The mere expression of an opinion by a witness as to the ability of the company which he represents to compete in a given territory, heretofore admitted as expert testimony.

Last Week's Evidence

Witnesses who testified during the final week of the hearing in Milwaukee reiterated to a large extent the evidence presented by previous witnesses. A new angle was introduced by the testimony of L. E. Geer, secretary and treasurer, and Herman A. Meyer, purchasing agent, Manitowoc Ship Building Corporation, Manitowoc, Wis. This testimony in effect was that the company in the last five years purchased approximately 42,000 tons of plates and other rolled material, of which amount about 90 per cent was purchased from the Illinois Steel Co. and shipped from mills in the Chicago or Gary districts, with the freight rate from Pittsburgh to Manitowoc invariably included in the invoice price, although billed f.o.b. Manitowoc. Both witnesses testified that the Manitowoc company lost a considerable quantity of business in competition with shipyards along Lake Erie because of the more advantageous geographical location of the Lake Erie yards in relation to the cost of material purchased upon a Pittsburgh basing point. The witnesses testified that they estimated the amount of money represented by unearned freight charges paid on steel in the past five years at $140,000.

E. E. Russell, vice-president J. I. Case Threshing Machine Co., Racine, Wis., in his testimony, revealed that his company fixes its selling prices by finding the cost of production and then adding a 10 per cent margin of profit. Thus, Mr. Russell testified, every purchaser of a Case product, wherever located, paid not only 10 per cent upon cost, but a similar percentage upon unearned freight charges when steel material was derived from mills near Racine and freight from Pittsburgh to Racine was added to the purchase price. Upon cross-examination, Mr. Russell admitted that the International Harvester Co. was able to sell threshers at a lower cost than the Case company, but that this difference did not materially affect the competition, which is

governed to a considerable extent by prestige and other considerations not related to cost and selling prices.

Fabrication in Transit Plan

Herman A. Wagner, president Wisconsin Bridge & Iron Co., Milwaukee, testified his company consumes about 16,000 tons of structural shapes annually on the average, and by reason of the imposition of unearned freight charges from Pittsburgh, it was impossible to compete on an equal basis with fabricators east of Chicago. Western competition is possible, he said, only under the fabrication-in-transit privilege, which imposes a penalty of 2c. per 100 lb. It has been the intention of the Wisconsin company to increase its capacity and enter Eastern fields of competition if it were not handicapped by the Pittsburgh basing point practice, Mr. Wagner said, but under existing conditions it is not possible to employ the capacity of the present plant to the utmost because the field is restricted.

W. T. Bastian, purchasing agent Harvey Spring & Forging Co., Racine, Wis., testified that his concern purchased about 10,000 tons of steel annually, and 84 per cent is shipped from mills of the Illinois Steel Co. in the Chicago district, but freight from Pittsburgh to Racine invariably was added, save in the last six or eight months, when purchases have been made on a Chicago basing point. E. J. Harvey, president of the company, testified that the steel represented 68 per cent of the cost of the finished article, and that 30 to 40 per cent of the material was wasted in the process, which increased the handicap he said his company was under in competing with competitors located nearer Pittsburgh, for business in such automotive centers as Cleveland, Detroit and Flint.

Irving Smith, president Sterling Wheelbarrow Co., Milwaukee, testified that he purchases 2000 tons of steel annually and that 30 per cent of this amount is derived from Chicago district mills, but freight from Pittsburgh is charged on such purchases as well as on those delivered by mills farther east.

W. E. McCollum, secretary Western Association of Rolled Steel Consumers, which is supporting the complaint of the Federal Trade Commission, stated that according to the best information available, Milwaukee fabricators of rolled steel consume between 150,000 and 200,000 tons annually. The freight rate from Pittsburgh to Milwaukee is 41½c. per 100 lb. He figures that unearned freight charges collected on material delivered from Chicago district mills amount to more than $1,000,000 annually under the Pittsburgh basing point practice.

Steel Plates Containing Zirconium and Other Elements

An investigation of the manufacture and properties of steel plates containing zirconium and other elements has been conducted by the Bureau of Standards and has been published as Technological Paper No. 207. The investigation originated from the need of the ordnance department of the army and navy for information regarding the effects on the ballistic properties of light armor plate of certain chemical elements such as zirconium:

A joint program was outlined according to which the Bureau of Mines was to produce and analyze ingots of the desired compositions; the Bureau of Standards to manufacture and heat treat the plates, carry out physical tests, micro-examinations and chemical analyses, and develop methods of chemical analysis, when needed, for the more unusual elements in steel and in the presence of each other; and the Navy Department was to carry out the ballistic tests.

Although the results of the ballistic tests are not available for publication, an account of the mechanical properties and tests of this series of somewhat unusual steels was considered worthy of publication. These results may be summarized as follows:

About 193 heats of steel containing in various combinations the following principal variable elements: carbon, silicon nickel, aluminum, titanium, zirconium, cerium, boron, copper, cobalt, uranium, molybdenum, chromium and tungsten, have been studied.

None of the steels presented any difficulties in rolling into plate except those containing boron.

The usual mechanical properties and impact tests were carried out on all of the steels. It is shown that steel containing 0.40 to 0.50 per cent carbon, 1.00 to 1.50 per cent silicon, 3.00 to 3.25 per cent nickel, and 0.60 to 0.80 manganese and deoxidized with a simple deoxidizer such as aluminum can be produced having a tensile strength of approximately 300,000 lb. per sq. in. with excellent ductility and toughness. This type of steel is recommended for a structural material.

Although the same high properties are obtained in steels of the above composition with the aid of additional elements, it does not appear necessary to resort to such additions of expensive alloying elements.

Zirconium, like titanium and aluminum, acts primarily as a scavenger, and when it is not removed as part of the slag remains in the steel in the form of square bright yellow inclusions not directly vesible at magnifications lower than 500 diameters. It is not considered that these inclusions can be very beneficial and if they are segregated and rolled out into thin plate-like streaks they may be detrimental, especially in armor plate.

Of the other elements that are regarded as special alloying additions, chromium, tungsten, vanadium and molybdenum go into solution and produce a martensitic pattern in the air-cooled specimens. Cerium and uranium act in a similar manner but also show characteristic inclusions. Copper goes into solution but a larger amount is required to produce a martensitic-pattern in the air-cooled samples than for the others. Boron forms a complex eutectic, probably that of an iron-carbon-boron compound with iron. This eutectic is fusible at the temperatures ordinarily used in rolling, but at slightly lower temperatures steel containing boron can be rolled successfully. Hot working breaks up the eutectic and spherical hard particles, similar to iron carbide globules, are formed.

Contract for Reconditioning the Leviathan

WASHINGTON, Feb. 21.—The contract for reconditioning the liner Leviathan, was formerly awarded by the Shipping Board last Wednesday, to the Newport News Shipbuilding & Dry Dock Co., Newport News, Va. The vessel is to be ready for service early in 1923. The work of putting the ship in condition for service will begin at once both at Hoboken, N. J., where the Leviathan now is, and at the yards of the Newport News company, which corporation will convert the steamer into an oil burner for the sum of $6,110,000. The contract for steward's equipment and interior furnishings was awarded to Gimbel Bros., New York., at $551,000. The total cost to the Shipping Board will be $8,200,000. The hull of the vessel will be painted at the Boston Navy Yard at a cost of $191,000.

Unavailing efforts were made by representatives and senators from Massachusetts to have the vessel reconditioned at the Boston Navy Yard, and qualifying legislation to this end was enacted.

Ford Co. New Brass Foundry to Use Electric Melting Equipment

The Detroit Electric Furnace Co., Detroit, has recently received an order from the Ford Motor Co. for five 2000-lb. 300 kva. Detroit rocking electric furnaces to be installed in the company's new brass foundry in the Highland Park plant. These furnaces are to be equipped with automatic electrode control and, together with the first Detroit unit already installed, will afford a melting capacity of approximately 150,000 lb. of metal per 16-hr. day. The battery of furnaces will be installed and in operation about April 1.

The Erie Foundry Co., Erie, Pa., recently completed an order for 67 steam drop hammers ranging in size from 800-lb. to 5000-lb. for the Ford Motor Co., for installation at its Highland Park plant. There are now approximately 100 Erie hammers in the Ford Motor Co. works.

LEATHER BELTING RESEARCH*

Manufacturers Have Conducted Investigation Into Various Phases of Its Use

The experienced belt-maker would probably say that the two most frequent sources of trouble are belts stretching and running crooked, the latter usually with very high speed drives where single belts are most likely to be used. It is evident that there are a number of things which may affect the stretch of a belt, such as the kind of hide used, tannage, method of currying—that is, the percentage and distribution of grease in the leather itself, and the thoroughness of stretching given to the leather before it is made into a belt. The hide of spongy fiber or consistency is likely to make leather that is more "stretchy." It is well-known that certain tannages, probably those which do not well fill the inter-fibular spaces, make leather which is more likely to stretch than that which is dead tanned.

Belts running crooked, when not due to abuse, are certainly sometimes caused by the springing of the piece of leather, after it is stripped to width, which is probably related somewhat to the factors influencing stretch just previously noted. With leather which is not very thoroughly tanned there seems to be a tendency for one edge of the strip to draw up more than the other after it has been stretched, and thereby pulling crooked. Aside from the annoyance to the user by having frequently to tighten the belt, the tendency to stretch causes a rapid reduction in the tension, and unless the coefficient of friction is unusually good, there results a rapid diminution in the effective tension and the work which the belt will do. While a moderate amount of stretch is perhaps not a serious matter, the importance of this being removed as soon as possible, so that an effective tension high enough to carry the load satisfactorily may be maintained is of great importance.

Increased Belt Tensions Not Unlikely

As far back as the days of Frederick Taylor considerable work was done in determining what was the proper tension to give a belt. He arrived at figures which were certainly conservative and practicable. I think there is not much doubt that if the belt users of the country had been willing to adopt his recommendations in this respect, they would have had greater economy with belting than has been the case. However, the tendency has been to load closer to the limit and to settle upon a tension which could be maintained fairly steadily, but which would give a maximum of power transmission. It would not be surprising to see higher tensions still adopted with improved methods of manufacture and better types of bearings.

Closely allied with the question of stretch is that of creep and its cause, and elasticity, which we have for a long time thought one of the most valuable properties of the leather belt, and one which differentiated it sharply from most of the substitutes available. Some of the work on this has been done by Mr. Jones and Professor Sawdon, which has thrown rather more light on earlier work and theories in connection with the subject.

Questions of Creep and Elasticity Studied

They have shown that the leather belt is not perfectly elastic in that it comes back immediately after the removal of tension, but that there is a time lag which may have some bearing upon the problem of transmission of power. Just what this is will probably vary a little with different leathers, but from the practical standpoint of power transmission it seems pretty clear that it will account for perhaps the first three quarters of one per cent or one per cent of what we read as slip in our power transmission curves, and it would seem reasonable that there is room for further improvement in reducing this a little more in a way which will increase slightly the efficiency of the leather belt.

The wide variation in the observed coefficient of friction readings on a belt when it is just new and that obtained after it has been in use some time shows clearly the importance of a proper finish on the surface. One interesting feature which had not been carefully studied until perhaps of recent times is in the observation that the coefficient of friction changes quite noticeably at different speeds of slip on a given piece of leather, though the coefficient of friction does not apparently change in any considerable way at different tensions. It is obvious that in a running belt the effective tension, which is the difference between the tension on the tight side and the slack side, is limited very definitely by the coefficient of friction obtained at a given speed of operation and of slip. This problem seems to be one of the very fertile fields for further work.

So far I have not mentioned the often spoken of factor of tensile strength, though it is apt to be one of the main things alluded to in leather belting specifications. I have not mentioned it because the factor of safety in a good leather belt is high, often 5 to 1 to 10 to 1, and it is a very rare thing to hear of a belt tearing because of the load applied to it, unless some accident has occurred.

Belt Speeds

Another very important factor in the capacity of a given belt to transmit power is speed, and while considerable work has been done on this subject, there is still a good deal to learn. It has only been a few years since a prominent leather belting manufacturer stated that he considered it good practice to run leather belts for woodworking machinery at speeds in the neighborhood of 9000 ft. per min. Other makers disagree with him. Dr. E. D. Wilson, in presenting data on the subject published in 1919 (and on which the tables published by the Exchange are based) has shown that at this speed a double belt will transmit practically no power and a single very little indeed.

There is no available machinery for actually making such tests at these high speeds, and general experience in which little scientific data is available seem to indicate that the greatest efficiency is obtained at speeds of 4000 to 5000 ft. per min. So far as I am aware, none of the data submitted take into consideration the effect of grease, and of the varying coefficient of friction at the high speed of slip which would be obtained at any such speed as 9000 ft. per min. We do know, of course, that the centrifugal force increases very fast on higher speeds, tending to throw the belts away from the pulleys, and it is likely that in scientific work on this subject when it is done thoroughly will, as is so often the case, bear out practical shop experience, at least in large measure, and recommend the limitation of speed to a more reasonable figure.

Some years ago the subject of humidity and its effect upon leather belts was investigated, but whether or not due consideration was given to the variation in the modern methods of currying from the old hand stuffing, and whether the tests were made on a large number of belts, or only on a few of one make, I am not aware. It does seem, however, pretty clear that the presence of large amounts of humidity lowers the effectiveness of a leather belt, but it is also likely that proper treatment will do something to lessen this tendency.

Use of Belt Tightening Pulleys

During the past few years the use of compressors and machines with a wide variation in loads has rather increased, and motor driven compressors with a binder pulley or tightener have become very much more common. This type of drive has received comparatively little careful investigation, though it has known to work quite well with proper installation and sufficient belt capacity. It does, however, seem quite clear that it is necessary to have more belt for a load of this kind based upon the power required from the motor than for an ordinary steady pull; some say twice

*From a paper read by J. Edgar Rhoads before the National Association of Leather Belting Manufacturers.

as much is needed, but I believe this is still another subject requiring careful test under well controlled conditions.

Closely allied with this is the question of arc of contact, the effect of increasing or decreasing this in the load which a belt will carry, and also the most effective way to arrange drives where there is a small driver and a large driven or vice versa.

The subject of center distance was investigated somewhat during this past year at Purdue University, but time prevented final or the most thorough kind of test. The mill-wright has known for a long time that increasing the center distance was a great help, and that with a well designed drive, the position of the catenary formed by the slack side on top was a great help in steadying the belt, particularly on sloping drives where belts were running at angles with the floor.

During the past few weeks a very careful comparison has been made to settle the much mooted question as to which side of a single belt should run next to the pulley, and Mr. Jones has prepared very complete figures which he has probably just about ready to publish, which represents an enormous amount of careful work and prove conclusively that the grain side of the leather belt is on the average decidedly superior to the flesh, though he has found that some belts, carrying very high amounts of grease, will do nearly as well when run with the flesh side to the pulley as the grain. These, however, are not representative of the great mass of standard leather belts upon the market.

POWDERED COAL INSTALLATIONS

Considerations of Capacity of Equipment and of Power Requirements for Pulverizing Coal

In a 131-page pamphlet, entitled "The Preparation, Transportation and Combustion of Powdered Coal," prepared by John Blizard, the Canadian Department of Mines has put forth a compendium of information on the subject, based partly upon direct investigation in the shape of field studies, and partly upon a compilation from printed data otherwise available. So much of the information in this volume is of permanent value that a portion of it, in the shape of tables, is republished here. This has been somewhat rearranged from the tables as given and has been amplified in certain particulars.

Table I—Standard Sizes and Capacities of Aero Pulverizers

	Size and Weight (Lb.)	Normal Load Soft Coal (Lb. per Hr.)	Floor Space (Inches)	Height (Inches)	R.p.m.	Horsepower: Normal Consumption	Horsepower: Motor Recommended	Space Occupied (Cu. Ft.)	Per Net Ton of Load: Weight (Lb.)	Per Net Ton of Load: Hp. Consumption	Per Net Ton of Load: Space (Cu. Ft.)
A.....	2,250	600	27¾ x 61¾	28¾	2,050	10	15	28.5	7,500	33.3	95.0
B.....	4,000	1,000	29 x 77½	45	1,750	14	25	58.5	8,000	28.0	117.0
D.....	5,400	2,000	29 x 85¾	46¾	1,550	30	40	67.3	5,400	30.0	67.3
E.....	5,900	3,000	33 x 89	50	1,450	40	50	85.0	3,933	26.7	56.6
G.....	12,000	5,000	40 x 116	59	1,450	65	90	158.4	4,800	26.0	53.4

Table I. shows standard sizes and capacities of Aero pulverizers, with normal loads ranging from 600 to 5000 lb. per hour of soft coal. This shows not only the size and weight of the pulverizer for the various capacities, but also the power consumption and the size of motor recommended

Table II—Fuller-Lehigh Dryers for Bituminous Coal with Not Over 10 Per Cent Moisture

Tons Coal per Hour	Size of Dryer: Diam. Ft.	Size of Dryer: Length Ft.	Volume Cu. Ft.	Volume per Ton Cu. Ft.	Horsepower to Rotate Shell	Horsepower per Ton Hourly Capacity
4	3	30	212	53	3	0.75
6	3½	30	289	48	4	0.67
8	4½	30	477	60	5	0.625
10	4½	42	668	67	6	0.6
14	5½	42	998	71	7	0.5
20	6	42	1,188	59	8	0.4
25	6½	42	1,394	56	10	0.4

Table II. shows the sizes of Fuller-Lehigh dryers and the power requirements for hourly capacities ranging from 4 to 25 tons of coal. These figures are given for bituminous coal containing not more than 10 per cent of moisture. When greater moisture is contained, in some cases larger sizes would be required, or the moisture removal would be less than standard.

Table III—Heat Required, and Undried Coal Burned, to Dry Coal Containing 4 to 14 Per Cent of Moisture, to 100 Lb. of Coal with 2 Per Cent of Moisture

Moisture in raw coal, per cent	4	6	8	10	12	14
Moisture evaporated, lb.	2.1	4.3	6.5	8.9	11.4	13.9
B.t.u. to evaporate this moisture....	2,300	4,700	7,200	9,900	12,600	15,500
B.t.u. given to 100 lb. of coal.....	4,100	4,100	4,100	4,100	4,100	4,100
Total heat used	6,400	8,800	11,300	14,000	16,700	19,600
Lb. coal burned at:						
70% efficiency....	0.68	0.95	1.25	1.58	1.93	2.32
60% efficiency....	0.79	1.11	1.46	1.84	2.26	2.71
50% efficiency....	0.95	1.34	1.76	2.21	2.71	3.25

Table III. shows the amount of heat required, and the amount of undried coal which has to be burned, in order to dry coal containing from 4 to 14 per cent of moisture. The figures are worked out on a basis of obtaining, as a final product, 100 lb. of coal with 2 per cent of moisture, and the coal consumption for drying is figured on a basis of 70 per cent, 60 per cent and 50 per cent efficiency in the combustion of the coal used for this purpose.

Table IV. shows the power required for pulverizing coal to certain degrees of fineness. In the first part of this table, which relates to Raymond pulverizers, capacities are covered from 1 to 25 tons of coal per hour. In the second part of the table, which relates to Fuller-Lehigh pulverizers, capacities range from ½ ton to 10 tons per hour.

Table IV—Power Required for Pulverizing Coal

A—In Raymond Pulverizers

Grinding Room Capacity, Tons per Hr.	Percentage Through: 100 Mesh	Percentage Through: 200 Mesh	Horsepower Required: Total	Horsepower Required: Per Ton
1	99	95	45	45.0
2	95	82	45	22.5
2	99	95	60	30.0
3	95	82	60	20.0
3	99	95	85	28.3
4	95	82	75	18.8
5	95	82	85	17.0
6	99	95	170	28.7
10	95	82	170	17.0
10	99	95	255	25.5
25	95	82	425	17.0
25	99	95	680	27.2

B—In Fuller-Lehigh Pulverizers (95 per cent through 100 mesh)

Size of Mill	Output per Hour	Horsepower	Horsepower per Ton Output
24-in.	1000 to 1200 lb.	10	18.0
33-in.	2 to 2½ tons	30 to 35	14.5
42-in.	4 to 6 tons	45 to 50	9.5
57-in.	8 to 10 tons	100	11.0

The Minnesota Steel Co., Duluth, Minn., has work in active progress on its new wire manufacturing plant on local site, and plans to commence the installation of machinery in about 60 days, having the entire plant ready for operation early in June.

The Alliance Structural Co., Alliance, Ohio, has increased its capital stock from $200,000 to $500,000.

BIDS OPENED ON TUNNEL JOB

Booth & Flinn, Ltd., Quotes Lowest Price $19,331,723.50, and Will Get Contract

Booth & Flinn, Ltd., 17 Battery Place, New York, was low bidder on the contract for construction work on the Hudson River vehicular tunnel, bids on which were opened at the Hall of Records, New York, Feb. 15, its price on contracts Nos. 3 and 4 being $19,331,723.50. Among the itemized bids a price of $57.50 per ton was submitted on the 33,200 tons of cast iron segments in contract No. 3 and $47.50 per ton on the 72,300 tons of cast iron segments in contract No. 4, totaling $1,782,440 and $3,434,250, respectively.

Booth & Flinn, Ltd., has handled numerous tunnel and subway construction contracts, among the most recent being the tunnel extending from Clark Street, Brooklyn, to Old Slip, New York, built for the Interborough Rapid Transit Co. and the Montague Street tunnel in Brooklyn, constructed for the Brooklyn Rapid Transit Co.; a tunnel from Fourteenth Street, New York, to North Seventh Street, Brooklyn; tunnel construction in Newark, N. J., for the Passaic Valley Sewage Commission; Liberty tunnel through rock, for Pittsburgh, and several contracts on clay tunneling for sewers in Detroit. Award of the sub-contracts for materials involved will probably be made by Booth & Flinn within the next week or 10 days.

Quotations on some of the iron and steel items in the Booth & Flinn bid were as follows: On the 2000 ft. of wrought iron or steel pipe, 1-in. to 4-in., quotations ranged from 40c. to $1.70 per ft. and totaled $2,130; on 34,400 ft. of galvanized iron electric conduit the prices were from 15c. to 75c. per ft. and totaled $10,468.50; on the cast-steel tunnel lining totaling 9,050 tons, $85 per ton was the price submitted in contract No. 4, and $90 per ton on contract No. 3, totaling $769,750; on cast-steel pile segments the total was 370 tons and the prices $85 and $90 per ton; on 15,590 ft. of cast-iron service pipe, ranging from 6-in. to 12-in., $1.40 to $3.50 per ft. was quoted; on bolts and nuts the total was 4,615 tons at $150 per ton, totaling on both contracts $692,250.

JAPANESE MERCHANTS BUYING

Purchases No Longer Confined to Government—German Competition Slackens—Low Rail Prices

NEW YORK, Feb. 20.—Practically all export inquiries of any importance are still appearing from Japanese sources with some slight activity on the part of China. Buying from Japan, which has heretofore been largely governmental, is beginning to include merchant buying. Last week one Japanese export house booked orders for about 1800 tons of merchant steel for Japan. This included 450 tons of merchant bars; 250 tons of structural steel; a tonnage of black and blue annealed sheets, and a fairly large order for 15-in. beams. Japanese buyers are beginning to evince a strong interest in steel bars and there have been several small orders booked by New York exporters. Sizes on these orders generally range from ⅜-in. to as large as ¾ and 1-in. One bar order for 600 tons is reported and another for 200 tons. Wire rods also continue active, one exporter having booked during the past two weeks about 2000 tons in small orders. A New York exporter is quoting on an inquiry for 200 tons of 42 to 80-lb. I beams of 15, 20, 22 and 24-in. and has sold about 5000 kegs of checker head, countersunk wire nails.

German competition in Far Eastern markets seems to be largely confined to material upon which labor is a large item. German bars, however, have quite recently been sold to Japanese buyers on a basis which figures back to 1.09c. per lb., Pittsburgh. British sellers are now quoting $53 per ton on wire rods, c.i.f. Japanese port. If this is the lowest possible price by United Kingdom sellers, exporters in the United States are contemplating selling wire rods into England, provided they can buy low enough to deliver at about $45 per ton, c.i.f. United Kingdom port.

The recent rail purchases by the Imperial Government Railways and the South Manchuria Railway Co. are said to have brought out low quotations. The Imperial Government Railway specification, which called for 10,000 tons of 60-lb. rails, is said to have been placed with a Japanese export house at $43.96 per ton, c.i.f. Japan, while the South Manchurian rail contract involving about 6800 tons of 100-lb. rails is said to have gone at $46.25 per ton, c.i.f. Dairen, Manchuria. On this latter the best bid possible by German mills was $47, but German bids through the United States were not permitted. Inquiries for rails by Far Eastern interests will undoubtedly bring out good prices. One New York exporter states that he was quoted $36.23 per ton, f.a.s., New York, on a tonnage of 35-lb. rails for the Far East and was given a still lower quotation by another mill.

Chinese activity is at present confined to purchases of small lots of black sheets, nails, second-hand structural steel and bar crop ends. The Japanese government inquiry for bridge material, which was to have closed the latter part of January, has been placed with one of the large Japanese export houses, which quoted on the price of a leading independent. It totals 4000 tons. Another tender on bridge material is still pending. Kobe municipality is in the market for another tonnage of T rails for its trolley line, bids on which will be opened the latter part of this month.

Steel Manufacturers Elect New Officers

At the annual meeting of the Association of American Steel Manufacturers, held at the William Penn Hotel, Pittsburgh, Feb. 17, Jesse J. Shuman, inspecting engineer Jones & Laughlin Steel Co., was elected president; E. F. Kennery, metallurgical engineer, Midvale Steel & Ordnance Co., vice-president, and J. O. Leech, manager bureau of inspection and tests, Carnegie Steel Co., secretary-treasurer. Robert H. Irons, Central Iron & Steel Co., retiring president, was presented with a silver after-dinner coffee service.

Shipping Board Will Sell Steel at Auction

WASHINGTON, Feb. 18.—After rejecting sealed bids which were opened last Wednesday, the Shipping Board has turned to the plan of disposing of the 105,000 tons of surplus steel at Hog Island by public auction and named to-day to sell the material in this manner. The board did not reveal either the number of bids received or prices offered nor its reason for rejecting them last week. It is said, however, that there were seven or eight bids received and that they were rejected because of the low figures named.

Hammond Iron Works, Warren, Pa., recently shipped on the Ward line steamer, Canto, from Baltimore, 95 carloads of fabricated plates, part of a contract for 13 82,000-barrel tanks for the Gulf Refining Co., Port Arthur, Texas. The tanks are 140-ft. in diameter and 30-ft. high.

The New England Iron League will hold its annual winter outing at Jackson, N. H. Members will leave Boston, Saturday afternoon, Feb. 18, and will return on the evening of Feb. 22. C. N. Fitts, New England Structural Co., Everett, Mass., has charge of arrangements.

The Anchor Concrete Machinery Co., Rock Rapids, Iowa, has moved to Adrian, Mich. The plant and site of the Adrian Steel Castings Co. have been purchased and machines for producing blocks, brick and cement will be made as soon as equipment can be installed.

Iron and Steel Markets

INCREASED ACTIVITY

February Exceeding January Production

Advances in Pig Iron But Weakness Still in Steel—Broad Demand Maintained

Increased pig iron and steel making is the outstanding factor of the week. It is the response to necessity buying and the railroad purchases of cars and track material of the past month.

The Steel Corporation is operating at better than 50 per cent, but business accumulated by the independents has shortened the gap between their scale of operations and that of the corporation. The Illinois Steel Co. is making 55 per cent of its capacity in ingots and the Inland Steel Co. is on a 60 per cent basis. Little of the railroad business went to the East, but the average of independent makers is over 40 per cent and the February production rate promises to exceed measurably the January output, which in steel was 46½ per cent of capacity.

An unexpected development was a well-defined effort to stabilize pig iron prices. Against doubts that advances can be held is the actual blowing in of at least five more blast furnaces, with two others scheduled to go on the active list before the end of the week.

It remains that rolling mills are yet unable to bring up order books to a point necessitating deferred shipments, and buyers, sure of deliveries, continue to cover merely for needs. Present activity represents orders taken at a sacrifice to establish backlogs and price weakness has not yet disappeared. A firmer attitude on new inquiries is, however, more general.

Railroad car business is still encouraging. The Great Northern, which closed on 500 cars, is still to buy 750; the St. Paul is expected shortly to cover for 2000 and the Pacific Fruit Express Co. for 3300. Five or six round lots of rail orders have been booked and the Gary mill has had releases on 20,000 tons on existing contracts.

The demand for bridge and building construction is indicated by fresh projects involving 22,000 tons and the awards aggregating 14,000 tons. January's business in fabricated structural steel, 72,100 tons, was at a rate of 40 per cent of the country's capacity and is barely 13 per cent under the January average for 10 years.

A few sales of various grades of pig iron have been made in the Chicago district on a basis of $20, an advance of $2 over recent quotations, but doubt is expressed that this advance can be maintained. The effect has been to cause firmer prices on irons which have been competing with the Chicago product. This is particularly noticeable in Cleveland, but concessions of 50c. have been made on iron from the Cleveland district when made in territory distant from Chicago. At Philadelphia there is more activity, but furnaces are absorbing freight when necessary.

Cast iron pipe awards, some of it seasonal, total 17,000 tons in a number of large size orders.

Three freight boats are now under negotiation for construction at Lake yards, each taking 4000 tons of steel.

The broadening market has brought increasing business from the automobile and the agricultural implement trade. The American Sheet & Tin Plate Co. has opened its books for the second quarter at to-day's prices.

In wire products there is no lack of inquiry from jobbers in preparation for spring demand. Manufacturers find it difficult to get concessions on small lots and hesitate to buy in a large way when meeting a refusal for a guarantee against price declines. Wire rods have been sold at $35 a ton, with $36 the usual quotation.

On shafting 2c. is still an asking price, but 1.90c. is the more common maximum, and even this is shaded.

Shading of $3 and $4 a ton is occasional on hot-rolled strips.

Rivets are lower, reductions in some centers amounting to $3 a ton. Structural rivets are now obtainable at $2.10 and boiler rivets at $2.20. For a large pipe line in the East, structural rivets were bought at close to $2.

A large order of tie plates was booked at less than $30 per ton at mill. Light rails are $1 and $2 a ton lower, and now a minimum at 1.40c. a pound.

Better export trade is indicated by participation of private buyers as distinguished from the recent large part taken by Government agencies. For bridge work in Japan 4000 tons of structural material has been placed. American prices in the Far East have so well cut under those of Europe that added promise is given to the possibility of shipping steel to European markets.

Pittsburgh

PITTSBURGH, Feb. 21.

Aside from a well-defined effort to stabilize pig iron prices, general iron and steel market conditions have undergone very little change in a week. Most producers of foundry iron now regard the market as $19, furnace, for the base grade, and similarly, $18, furnace, has been set up as a minimum on basic. Some fair-sized tonnages of foundry iron have been placed in the past week at $19, but there also was a good-sized transaction at $18.75, this from a Valley furnace. A sale of 1000 tons of basic is noted to a Pittsburgh district sheet maker, but not very definite information as to the price is obtainable. There are reports that the business was placed at $18, and also that the price paid was the same as on the last previous purchase by the same interest, which was $17.75. It is clear that none of the producers went below $18 on this inquiry, but all disclaim having taken the order, and the assumption is that it was placed at less than that figure.

General demand for steel still is for actual rather than future requirements and there has not been much change one way or another in the number of orders placed.

The possibility of a strike of union coal miners on April 1 has come only slightly into the foreground as a factor, but it is seen in the efforts of manufacturers to stock material against such an exigency rather than in any advance buying by either jobbers or con-

A Comparison of Prices

Advances Over the Previous Week in Heavy Type, Declines in Italics

At date, one week, one month, and one year previous

For Early Delivery

Pig Iron,	Feb. 21, 1922	Feb. 14, 1922	Jan. 24, 1922	Feb. 22, 1921
Per Gross Ton:				
No. 2X, Philadelphia‡	$21.34	$21.34	$21.34	$30.09
No. 2, Valley furnace†	18.75	18.75	19.00	27.00
No. 2, Southern, Cin'ti†	20.00	20.00	20.50	32.00
No. 2, Birmingham, Ala.†	15.50	15.50	16.00	27.50
No. 2 foundry, Chicago*	**20.00**	18.00	19.00	28.00
Basic, del'd, eastern Pa.	19.84	19.84	20.25	28.40
Basic, Valley furnace	17.75	17.75	18.00	25.00
Bessemer, Pittsburgh	21.46	21.46	21.46	28.96
Malleable, Chicago*	**20.00**	18.00	19.00	28.50
Malleable, Valley	19.00	19.00	19.50	27.00
Gray forge, Pittsburgh	20.71	20.71	20.96	27.96
L. S. charcoal, Chicago	30.50	30.50	30.50	38.50
Ferromanganese, del'd	62.50	62.50	60.00	90.00

Rails, Billets, etc.,				
Per Gross Ton:				
O.-h. rails, heavy, at mill	$40.00	$40.00	$40.00	$47.00
Bess. billets, Pittsburgh	28.00	28.00	28.00	38.50
O.-h. billets, Pittsburgh	28.00	28.00	28.00	38.50
O.-h. sheet bars, P'gh	29.00	29.00	29.00	42.00
Forging billets, base, P'gh	32.00	32.00	32.00	43.50
O.-h. billets, Philadelphia	33.74	33.74	33.74	49.24
Wire rods, Pittsburgh	*35.00*	36.00	36.00	52.00
	Cents	Cents	Cents	Cents
Skelp, gr. steel, P'gh, lb.	1.50	1.50	1.50	2.45
Light rails at mill	*1.40*	1.50	1.50	2.75

Finished Iron and Steel,				
Per Lb. to Large Buyers:	Cents	Cents	Cents	Cents
Iron bars, Philadelphia	1.76	1.76	1.81	2.70
Iron bars, Chicago	*1.55*	1.60	1.60	2.63
Steel bars, Pittsburgh	1.40	1.40	1.50	2.00
Steel bars, Chicago	*1.50*	1.55	1.60	2.38
Steel bars, New York	1.78	1.78	1.83	2.38
Tank plates, Pittsburgh	1.40	1.40	1.50	2.15
Tank plates, Chicago	*1.50*	1.55	1.60	2.53
Tank plates, New York	1.78	1.78	1.83	2.53
Beams, Pittsburgh	1.40	1.40	1.50	2.15
Beams, Chicago	*1.50*	1.55	1.60	2.53
Beams, New York	1.78	1.78	1.83	2.53
Steel hoops, Pittsburgh	1.90	1.90	1.90	2.80

*The average switching charge for delivery to foundries in the Chicago district is 70c. per ton.
†Silicon, 1.75 to 2.25. ‡Silicon, 2.25 to 2.75.

Sheets, Nails and Wire,	Feb. 21, 1922	Feb. 14, 1922	Jan. 24, 1922	Feb. 22, 1921
Per Lb. to Large Buyers:	Cents	Cents	Cents	Cents
Sheets, black, No. 28, P'gh	3.00	3.00	3.00	4.10
Sheets, galv., No. 28, P'gh	4.00	4.00	4.00	5.35
Sheets, blue an'l'd, 9 & 10	2.25	2.25	2.25	3.20
Wire nails, Pittsburgh	2.40	2.40	2.50	3.10
Plain wire, Pittsburgh	2.15	2.15	2.25	3.00
Barbed wire, galv., P'gh	3.05	3.05	3.15	3.85
Tin plate, 100-lb. box, P'gh	$4.75	$4.75	$4.75	$7.00

Old Material,				
Per Gross Ton:				
Carwheels, Chicago	$15.00	$15.00	$15.00	$19.00
Carwheels, Philadelphia	16.50	16.50	16.50	23.00
Heavy steel scrap, P'gh	**14.00**	13.50	14.00	16.00
Heavy steel scrap, Phila.	12.00	12.00	11.50	14.50
Heavy steel scrap, Ch'go	**11.50**	11.25	11.50	14.50
No. 1 cast, Pittsburgh	16.00	16.00	16.50	22.00
No. 1 cast, Philadelphia	16.50	16.50	16.50	23.00
No. 1 cast, Ch'go (net ton)	**13.50**	13.00	13.00	17.50
No. 1 RR. wrot. Phila.	14.50	14.50	14.50	19.00
No. 1 RR. wrot, Ch'go (net)	10.50	10.50	10.50	13.00

Coke, Connellsville,				
Per Net Ton at Oven:				
Furnace coke, prompt	**$3.25**	$2.90	$2.75	$4.50
Foundry coke, prompt	4.00	4.00	3.75	5.50

Metals,				
Per Lb. to Large Buyers:	Cents	Cents	Cents	Cents
Lake copper, New York	*13.00*	13.25	13.75	13.25
Electrolytic copper, refinery	*12.75*	13.00	13.50	12.75
Zinc, St. Louis	4.50	4.50	4.65	4.95
Zinc, New York	4.85	4.85	5.00	5.35
Lead, St. Louis	4.40	4.40	4.40	4.20
Lead, New York	4.70	4.70	4.70	4.40
Tin (Straits), New York	*29.62½*	30.75	31.25	32.50
Antimony (Asiatic), N. Y.	4.40	4.40	4.45	5.20

The prices in the above table are for domestic delivery and do not necessarily apply to export business.

Composite Price, Feb. 21, 1922, Finished Steel, 2.005c. Per Lb.

Based on prices of steel bars, beams, tank plates, plain wire, open-hearth rails, black pipe and black sheets

These products constitute 88 per cent of the United States output of finished steel.

Feb. 14, 1922,	2.005c.
Jan. 24, 1922,	2.062c.
Feb. 22, 1921,	2.821c.
10-year pre-war average,	1.689c.

Composite Price, Feb. 21, 1922, Pig Iron, $18.35 Per Gross Ton

Based on average of basic and foundry irons, the basic being Valley quotation, the foundry an average of Chicago, Philadelphia and Birmingham

Feb. 14, 1922,	$18.02
Jan. 24, 1922,	18.39
Feb. 22, 1921,	26.76
10-year pre-war average,	15.72

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sumers. Having access to so much non-union coal, steel makers in the Pittsburgh district are not seriously perturbed over the strike possibility and while indications point rather strongly to a strike or a suspension of union mines over the wage question, there is a belief that Government intervention may come before the crisis is reached. The prospect of trouble is looked upon pretty calmly here, not only because there has been a good deal of quiet stocking of coal, both by the railroads and industrial consumers during the past few weeks, but because business is not so heavy or urgent that a suspension would be looked upon as serious.

Steel prices do not change much, but as a general proposition they lean in favor of buyers. The American Sheet & Tin Plate Co. yesterday opened its books for second quarter business, naming the same prices as for first quarter orders. This interest also has reaffirmed the base of $4.75 for tin plate on second quarter contracts from jobbers. The market is at least steady on these products, although intimations of concessions still are common, and on merchant steel bars there appear to be no important deviations from 1.40c. base. The market is not very firm at 1.40c. for beams and plates nor for other finished steel products not specifically referred to.

A flurry in the coke market last week strengthened coal prices, but prices of both products this week show a reactionary tendency. The scrap market has strengthened slightly as a result of purchases of some of the mills outside of Pittsburgh, which serve to bring to the surface the meagerness of available supplies.

Pig Iron.—There is a distinctly firmer tone to the market, due partly to a somewhat larger demand, which shows more strongly in foundry than in the other grades, and partly to an increasing unwillingness on the part of producers to meet prices recently done. A sanitary ware manufacturer with plants in this district and in the South has bought about 1500 tons for each plant, or a total of 4500 tons of foundry iron for March delivery. On Northern iron, this interest was

able to buy a No. 2 Valley iron at $18.75, but paid $19 at furnaces outside the Valley district, which, however, have slightly lower freight rates to point of consumption than the Valley furnaces. This interest also was able to buy some No. 2 foundry iron from Valley furnaces at $19. On its Southern iron, some of the tonnage was secured at $15, Birmingham. The National Radiator Co. is in the market for 2000 to 2500 tons of No. 2 and No. 2X foundry, for March, April and May delivery in equal amounts to its New Castle and Johnstown, Pa., plants. Producers now are generally quoting $19, and it is claimed that some fair sized lots have been placed at this price in the past few days. Western Pennsylvania furnaces probably will be able to do more business in Johnstown from now on, as it is reported that the stack of the Cambria Steel Co., which had been on foundry grade, lately was shifted over to steel making iron. In addition to a purchase of 1000 tons of basic, a Pittsburgh district sheet maker also has taken 300 tons of Bessemer which it is understood will come from Johnstown, Pa. The rate from that point to destination is the same as from the Valley, or $1.96, and the sales price is understood to have been around $19. Valley furnaces having any of this grade for sale are holding to $19.50, but middlemen have lately been taking small lots about 25c. below that price.

We quote Valley furnace, the freight rate for delivery to the Cleveland or Pittsburgh district being $1.96 per gross ton:

Basic	$17.75 to $18.00
Bessemer	19.50
Gray forge	18.75 to 19.00
No. 2 foundry	18.75 to 19.00
No. 3 foundry	18.75 to 19.00
Malleable	19.00

Ferroalloys.—A Valley steel maker who recently inquired for 100 tons of 16 to 19 per cent spiegeleisen is reported to have covered this requirement at $30 delivered and the price of $30, furnace, recently named by an Eastern maker, remains merely a quotation as far as sales in this and nearby districts are concerned. Interest in ferroalloys generally is pretty low in this district and prices largely are nominal. Despite the recent cut of $2 per ton in Jackson, Ohio, prices of Bessemer ferrosilicon, the advantage in price still is with producers making this material in the electric furnace, and the former moves slowly. On 50 per cent ferrosilicon a price of $55, furnace, freight allowed, still is being made, though the more common range is from $57 to $60. The recently established prices for ferromanganese have not yet found basis in sales.

We quote 78 to 82 per cent ferromanganese, $62.50 c.i.f. Atlantic seaboard for domestic and English and $58.35 for German. Average 20 per cent spiegeleisen, nominal; 16 to 18 per cent, $30 to $35, delivered Pittsburgh or Valleys; 50 per cent ferrosilicon, domestic, $55 to $60 furnace, freight allowed. Bessemer ferrosilicon is quoted f.o.b. Jackson and New Straitsville, Ohio, furnaces as follows: 10 per cent, $36.50; 11 per cent, $39.80; 12 per cent, $43.10; 13 per cent, $47.10; 14 per cent, $52.10; silvery iron, 6 per cent, $25; 7 per cent, $26; 8 per cent, $27.50; 9 per cent, $29.50; 10 per cent, $31.50; 11 per cent, $34; 12 per cent, $36.50. The present freight rate from Jackson and New Straitsville, Ohio, into the Pittsburgh district is $4.06 per gross ton.

Billets, Sheet Bars and Slabs.—The market is beginning to reflect the recently enlarged movement of finished products, but this is seen more in freer specification against contracts than in new business, although sales are slightly more numerous than they were recently. A middle interest is seeking 200 tons of slabs and inquiries for forging billets are coming to makers with a little more frequency than recently was the case. Prices do not change much, but since there is considerable competition between Pittsburgh and Valley mills, equalization of freights is common practice.

We quote 4 x 4-in. soft Bessemer and open-hearth billets at $28 to $29; 2 x 2-in. billets, $29 to $30; Bessemer and open hearth sheet bars, $29 to $30; slabs, $29 to $30; forging billets, ordinary carbons, $32 to $33, all f.o.b. Youngstown or Pittsburgh mills.

Wire Rods.—Demand is moderate and with business in finished products possible only at concessions from regular prices, considerable difficulty is experienced in selling rods at recent levels. We note a fair-sized sale of screw stock rods at $40, mill, and on soft rods, $36 lately has been maximum, while sales have been done as low as $35. Buyers seem willing to pay the latter price and usually find accommodation. Prices are given on page 559.

Steel Skelp.—Open market inquiries are so few and small that prices are indeterminate. Makers still quote 1.50c. for pipe skelp, but this may be regarded merely as a negotiation quotation, which would be shaded, probably to the plate base, on the appearance of sizable inquiries.

Wire Products.—There is no lack of inquiry from the jobbers, most of whom are going along with light stocks and who appear to want to prepare for the spring demand, but actual business is kept down by the uncertainty over prices. Practically all manufacturers are taking business from the larger distributors at $2 per ton below the Dec. 15, 1921, prices and the smaller factors seem to believe they should be able to buy at the same prices. It is because manufacturers are unwilling at the moment to meet this demand or to give guarantees against a decline in prices that larger orders are not being booked.

We quote wire nails at $2.40 to $2.50 base per keg, Pittsburgh, and bright basic and Bessemer wire at $2.15 to $2.25 base per 100 lb., Pittsburgh.

Steel Rails.—The market is definitely weaker on light rails with prices off $1 to $2 per ton from recent levels. In the immediate Pittsburgh district, makers of these sections, rolling them from new steel, are able to obtain 1.45c., base, but to the East as low as 1.40c. has been done and some business has been lost at that price to mills rerolling old standard sections.

We quote 25 to 45-lb. sections, rolled from new steel, 1.40c. to 1.45c. base; rolled from old rails, 1.35c. to 1.40c. base; standard rails, $40 per gross ton mill for Bessemer and open-hearth sections.

Iron and Steel Bars.—Suggestions that business in merchant steel bars has been taken as low as 1.35c., Pittsburgh, are denied by makers here, at least as far as Pittsburgh and nearby points are concerned. Demands are not large, but they are fairly numerous and it is insisted that 1.40c. is minimum. However, there is not much support for a higher price, even on small lot orders. Makers of refined iron bars still are holding to 2c., minimum, for carload lots.

We quote steel bars rolled from billets at 1.40c.; reinforcing bars, rolled from billets, 1.40c. to 1.50c. base; reinforcing bars, rolled from old rails, 1.35c. to 1.40c.; refined iron bars, 2c. to 2.10c. in carloads, f.o.b. mill, Pittsburgh.

Structural Material.—Fabricating companies in this trict are busy in their estimating departments, but not in their shops. Only small lot jobs are coming out in this district. Plain material is slow of sale and the accepted base now is 1.40c., even on comparatively small tonnages. Prices are given on page 559.

Sheets.—The American Sheet & Tin Plate Co., as of Feb. 20, opened its books for second quarter business, naming the same prices as it quoted for the present quarter, or 3c. base for black, 4c. base for galvanized and 2.25c. base for blue annealed. It is stated in explanation for the comparatively early announcement of second quarter prices that there were a number of inquiries for that delivery. Affirmation of present prices by this interest should serve to dispel suggestions of higher prices which have been heard lately in some quarters. There is a pretty general observance of present prices on black and galvanized sheets where new rollings are involved, but stock material can be bought at concessions and it is a fact that some contracts placed $5 per ton below current quotations have more elasticity than they were intended to have. Demand is steady rather than active, with not much anticipation of needs. The Steel Corporation sheet making subsidiary this week is operating more than 70 per cent of its mills, with the independents running about 50 per cent. Prices are given on page 559.

Tin Plate.—Current demands are light, but the mills keep well engaged on contract specifications. February is never a very active month, but by comparison with other years, it is showing relatively well this year. The

American Sheet & Tin Plate Co. has announced a price of $4.75 per base box, Pittsburgh, on second quarter contracts from jobbers.

We quote standard production coke tin plate $4.75 per base box f.o.b. Pittsburgh for carload lots.

Plates.—There is some business pending in connection with tank and large size pipe inquiries, but in a broad sense the market is quiet and buyers are confining their purchases closely to actual needs. The going market is 1.40c., but since this prevails on small tonnages, there is a common impression that sizable orders could be placed at 1.35c.

We quote sheared plates, ¼ in. and heavier, tank quality, 1.40c. f.o.b. Pittsburgh.

Hoops and Bands.—The market does not appear to be quotable at above 1.90c. on either product, although the official quotation on hoops still is 2c. A range of 1.75c. to 1.90c. is quoted on bands, while some business in hoops has been placed at 1.80c.

Hot-Rolled and Cold-Rolled Strips.—Buyers continue to take supplies only as they are needed, and while a fair number of orders is being placed, the aggregate leaves much to be desired. On cold-rolled strips there is not much deviation from the 3.50c. base, but on comparatively attractive orders for hot-rolled strips the regular quotation of 2c. is being shaded as much as $3 and $4 per ton.

Iron and Steel Pipe.—Makers of both steel and wrought iron pipe are enjoying a reasonably good business with orders and specifications showing almost as great a gain so far this month over January as that month showed over December. In steel pipe, orders for oil country goods lately have been gaining and with some makers they are as large as those for merchant pipe. Line pipe inquiries are fairly numerous and it is believed one for 98 miles of 12-in. for a gas line from Monroe to Alexandria, La., inquired for by the Hope Engineering & Supply Co., Mount Vernon, Ohio, will be closed soon. Observance of the Dec. 16 price card is not particularly rigid, with rather low prices being named on line pipe. Plant operations are higher than are warranted by current orders, but there is some stocking in anticipation of plant suspension in the event of a strike of the union coal miners. Card discounts are given on page 559.

Boiler Tubes.—Business is picking up in steel tubes, but there are not enough orders to give all makers a share and price cutting still is pretty common. There are no established quotations on seamless tubes and the quoted discounts on lapwelded goods frequently are supplemented by an additional 5 per cent. Iron tubes are relatively firm. Discounts are given on page 559.

Nuts and Bolts.—Business is no more than it has been, but it does not show much increase either, and as far as makers in this district are concerned, it is pretty much localized, due to the fact that on most sizes and styles, buyers can save money by placing business with mills having a lower freight rate than those observing the Pittsburgh base. Demand is purely hand-to-mouth. Discounts are given on page 559.

Cold-Finished Steel Bars and Shafting.—There is just a fair demand for screw stock and shafting, purchases of which for the most part merely are for the rounding out of stocks. Jobbers in some parts of the country still have unliquidated stocks and the agricultural implement industry has had little opportunity to work off big purchases of 1920. Stocks in distributing and consuming hands as a whole are small by comparison with what they have been in recent years, but this is not necessarily a favorable augury. It is recognized that even when general business returns to its normal stride, there will hardly be a repetition of the urgent demands of early 1920 and consequently not the necessity for consumers and jobbers to carry big stocks. For some time it is probable that supply will be sufficient for all demands, and so long as delivery can be made in two or three weeks, buyers will feel safe with about half the stocks they formerly carried. The "official" quotation on cold-rolled or cold-drawn steel bars still is 2c., but 1.90c. is the more common maximum and even that price is being shaded against occasional orders of attractive features. Ground shafting is unchanged at 2.25c., base, mill, for carloads.

Rivets.—The market is very largely a buyer's affair, and while an effort is being made to maintain $2.25 to $2.35, base, per 100 lb. on heavy rivets, it is frankly admitted that these prices are being obtained only on retail lots and that attractive orders can be placed $2 to $3 per ton less. Prices and discounts are given on page 559.

Spikes.—No information yet has been received here as to the disposition of the 30,000 to 40,000 kegs of spikes for the New York Central Lines. It is rumored that the order has been divided between the Lackawanna Steel Co. and Jones & Laughlin Steel Co., but the latter company has no official advices with regard to the order. Prices on standard spikes still are inclined lower and the common belief is that the New York Central business will be placed at less than $2.15, base, per 100 lb., the minimum public quotation of makers. Prices are given on page 559.

Coal and Coke.—Two or three good-sized orders for furnace coke last week resulted in such a complete cleaning up of available tonnages that the advance of the previous week was further extended, some sales being made as high as $3.50 per net ton ovens. Demands having been satisfied, however, the market this week has grown weaker and $3.25 now appears to be as high as any business can be done. Higher prices for coke have naturally enhanced the appraisal value of coal, but there has not been sufficient demand to sustain the advance and the market is weaker this week. Some business in by-products coal was done as high as $2 at mines, for run-of-mine, but in the past few days the market has settled back to $1.85 as a maximum, with some tonnages available at less. The current price on steam coal for spot tonnages is right around $1.50 for mine-run grade, while non-union gas coal can be bought at $1.90 for spot or prompt shipment. Foundry coke for spot shipment ranges from $4 to $4.50.

Old Materials.—The market has grown distinctly firmer on the steel works grades since a week ago, due to purchases by mills outside the Pittsburgh district proper. Some of these melters who ordinarily charge light scrap, unable to obtain tonnages except at relatively stiff prices, have turned to the heavier grades and this demand has stiffened prices. Neither dealers nor consumers lately have been able to obtain even carload lots at less than $14. A price equivalent to about $14.50 at Pittsburgh has been paid by Youngstown mills. The market has been helped not only by the slightly heavier demand, but also by light offerings. Dealers are not pressing yard stocks for sale and current production is restricted by the light operations of producing industries. Only small lots of compressed or bundled sheet scrap are coming out because of that condition. There is not much demand for the foundry grades.

We quote for delivery to consumers' mills in the Pittsburgh and other districts taking the Pittsburgh freight rate, as follows:

Heavy melting steel, Steubenville, Follansbee, Brackenridge, Monessen Midland and Pittsburgh	$14.00 to $14.50
No. 1 case, cupola size	16.00 to 16.50
Rerolling rails, Newark and Cambridge, Ohio; Cumberland, Md.; Huntington, W. Va., and Franklin, Pa.	15.00 to 15.50
Compressed sheet steel	12.00 to 12.50
Bundled sheets, sides and ends	10.75 to 11.25
Railroad knuckles and couplers	14.50 to 15.00
Railroad coil and leaf springs	14.50 to 15.00
Low phosphorus standard bloom and billet ends	17.00 to 17.50
Low phosphorus plates and other grades	16.50 to 17.00
Railroad malleable	12.50 to 13.00
Iron car axles	23.00 to 24.00
Locomotive axles, steel	21.00 to 22.00
Steel car axles	14.50 to 15.00
Cast iron wheels	15.00 to 15.50
Rolled steel wheels	14.50 to 15.00
Machine shop turnings	9.50 to 10.00
Sheet bar crop ends	14.00 to 14.50
Heavy steel axle turnings	11.50 to 12.00
Short shoveling turnings	11.00 to 11.50
Heavy breakable cast	14.50 to 15.00
Stove plate	12.50 to 13.00
Cast iron borings	11.00 to 11.50
No. 1 railroad wrought	11.50 to 12.00

The Bureau of Supplies and Accounts, Navy Department, Washington, is taking bids until Feb. 28 for 65,000 lb. of slab zinc for use at the Norfolk, Va., navy yard.

New York

NEW YORK, Feb. 21.

Pig Iron.—Interest is centered in the bids for the segments for the New York-New Jersey vehicular tunnel, and while nothing definite is known except the names of the firms that have been figuring with the successful bidders, Booth & Flinn, it is generally expected that contracts for the segments are likely to go to the Federal Shipbuilding Co., the Bethlehem Steel Co. and Davies & Thomas. The tonnage may be divided among these three, or some of it may go to others, but the three concerns named are considered as best equipped to do the work. Davies & Thomas have done a large part of the work on previous tunnels at their plant at Catasauqua, Pa., and the Bethlehem Steel Co. is considered especially well equipped. Outside of the tunnel business no large tonnages are being figured on, but the Essex Foundry Co., Newark, N. J., is in the market for from 500 to 1000 tons of No. 2X for delivery after March 1, and it is understood that the contract will not be made until next week. Numerous smaller inquiries are pending and the most encouraging feature of the situation is that a large number of foundries report increasing melt.

We quote delivered in the New York district as follows, having added to furnace prices $.52 freight from eastern Pennsylvania, $5.46 from Buffalo and $6.16 from Virginia:

East. Pa. No. 1 fdy., sil. .75 to 3.25..	$23.52
East. Pa. No. 2X fdy., sil. 2.25 to 2.75	23.02
East. Pa. No. 2 fdy., sil. 1.75 to 2.25..	22.52
Buffalo, sil. 1.75 to 2.25.....$23.46 to	23.71
No. 2 Virginia, sil. 1.75 to 2.25.....	28.16

Ferroalloys.—Demand for ferromanganese is not heavy, sales being confined to carload lots and inquiries totaling about 500 tons. Quotations are unchanged at the higher levels recently put into effect. The spiegeleisen market continues fairly active in the absence of stocks of the 20 per cent grade, and in the belief that the quantity of the 16 to 19 per cent grade available is small. Inquiries before the market amount to about 1000 tons, but there has been no change in the asking price from that announced a week ago. There have been no developments in the manganese ore market, but from offerings that have appeared from sellers it is likely that high-grade foreign ore could not be purchased at less than 25c. to 26c. per unit, seaboard. The 50 per cent ferrosilicon market is quiet and firm at unchanged levels, sales being confined to carload lots, several having been sold in the past week, among which is noted one carload at $59, Chicago. The recent reduction in quotations for Bessemer ferrosilicon of $2 per ton is understood to have been caused by the competition of electric ferrosilicon of approximately the same percentage content of silicon, as well as the fact that the 50 per cent grade can be used to advantage and bought as cheaply as Bessemer in proportion to the silicon content. Quotations are as follows:

Ferromanganese, domestic, seaboard, per ton	$62.50
Ferromanganese, British, seaboard, per ton	$62.50
Spiegeleisen, 16 to 19 per cent, furnace, per ton	$30.00
Ferrosilicon, 50 per cent, delivered, per ton,	$55.00 to $60.00
Ferrotungsten, per lb. of contained metal	40c. to 50c.
Ferrochromium, 6 to 8 per cent carbon, 60 to 70 per cent Cr., per lb. Cr., delivered	12c. to 14c.
Ferrovanadium, per lb. of contained vanadium	$4.00
Ores	
Manganese ore, foreign, per unit, seaboard	25c. to 26c.
Tungsten ore, per unit, in 60 per cent concentrates	$2.00 up
Chrome ore, 40 to 45 per cent Cr_2O_3, crude, per net ton, Atlantic seaboard	$20.00 to $25.00
Chrome ore, 45 to 50 per cent Cr_2O_3, crude, per net ton, Atlantic seaboard	$25.00 to $27.00
Molybdenum ore, 85 per cent concentrates, per lb. of MoS_2, New York	50c. to 60c.

Finished Iron and Steel.—Betterment is difficult to measure except through increasing mill operations. There is evidence that the small replenishment orders are making a gradually increasing aggregate, although in an individual selling office the daily volume fluctuates so that it is difficult to define the trend. Fabricated steel work still remains active, though there is at the moment a drop in the total of fresh projects. The East is not as yet getting any sizable railroad equipment business. Uncertainty exists with regard to the stability of wire and wire products prices and there are intimations that better than 1.40c. Pittsburgh can still be done on large orders for plates, shapes and bars. About the only structural project which has come to light covers 100 tons for the American Car & Foundry Co., Huntington, W. Va. For the shields for the vehicular tunnel under the Hudson river 9000 to 11,000 tons of steel work will be required. Awards were in part as follows: New York Cotton Exchange, 4000 tons, to Post & McCord; West Penn power house, Wellsburg, 2900 tons, to Fort Pitt Bridge Works; apartment house, Kingsbridge Road and Grand Concourse, New York, 850 tons, to Levering & Garrigues Co.; Orient Life Insurance Co., Hartford, 500 tons, to Levering & Garrigues Co.; apartment house, 108th Street and Riverside Drive, 1000 tons, to A. E. Norton Co.; shelters for the Pennsylvania Railroad at Jersey City, 300 tons, for which the Triest Contracting Corporation is the general contractor; plate girders for the New York Central at Tonawanda, N. Y., 300 tons, to Lackawanna Bridge Works Corporation; United States Gypsum Co., Oakfield, N. Y., 106 tons, to the Lackawanna Bridge Works Corporation; tanks for Mexican Petroleum Co., 2 at Providence, 2 at Portland, Me., 700 tons, to the American Bridge Co. Outside of car repair contracts for the Boston & Maine and the Norfolk & Western, about the only Eastern railroad work covers 50 suburban cars awarded to the Harlan & Hollingsworth plant of the Bethlehem Steel Co. The Great Northern placed an order for 500 refrigerator cars with the General American Car Co. and is in the market for 250 gondolas and 500 stock cars. The Pacific Fruit Express Co. will probably buy 3300 cars and the St. Paul may buy 2000 cars. Car builders are inclined to believe that there will be plenty of business to satisfy the plants of the country by the latter half of the year.

We quote for mill shipments, New York, as follows: Soft steel bars, 1.78c. to 1.88c.; plates, 1.78c. to 1.88c.; structural shapes, 1.78c. to 1.88c.; bar iron, 1.78c. to 1.88c. On export shipments the freight rate is now 28.5c. per 100 lb., instead of 38c., the domestic rate.

High Speed Steel.—The market continues dull with sales of extremely small quantities only reported. There is some shading of prices and a fair estimate of the market on 18 per cent tungsten high speed steel is probably 80c. to 90c. per lb. with special brands of some companies selling up to $1.05 per lb.

Cast-Iron Pipe.—Optimism still prevails in this market and purchases by private consumers are slightly larger than usual. At present no municipal lettings are in sight in this district excepting the pipe involved in the Hudson River vehicular tunnel, which will be purchased by Booth & Flinn, Ltd., New York. The Metropolitan Water Supply Co., Boston, has closed on 3000 tons of 12-in. to 24-in. cast iron pipe with the Warren Foundry & Machine Co. The 600 tons of pipe, to be purchased by contractors with municipal contracts in New York, has not yet been bought. We quote per net ton, f.o.b. New York, carload lots, as follows: 6-in. and larger, $47.30; 4-in. and 5-in., $52.30; 3-in., $62.30, with $4 additional for Class A and gas pipe.

Warehouse Business.—The market is fairly active, the increase in business during the past few weeks being well maintained. Warehouses carrying structural material continue to report more than usual activity, but it is believed that there has been some shading of quoted prices along this line. A domestic and export seller in this district is offering a fairly large tonnage of structural material, bars, angles, beams, channels and plates, at a price of $28 per ton, f.o.b. point of shipment. This is, however, probably canceled material. Sheets are slightly stiffer on small lots, but a satisfactory tonnage of galvanized or black sheets would bring out a good concession. In general, prices in this line are uneven. Offerings of one company of new galvanized and black sheets at considerably under the prevailing prices are said to be seconds. The railroads are buying small lots of special steels. German tool steel is being offered by a Philadelphia importer at 7.75c. per lb., f.o.b. Hamburg, which is about 9c. per lb. New York. The wrought iron and steel pipe mar-

ket is quiet. Brass rods have dropped ½c. per lb. from 14¾c. to 14¼c. per lb. We quote prices on page 576.

Coke.—The Eastern By-Product Coke Co. has quoted $4.50 on 700 tons per month for the coke which will be required by foundries making segments for the new vehicular tunnel, and it is understood that another company named even a lower figure, but it was not accepted. Owing to the fact that coal has been sold readily and that there is an active demand for coke due to fear of a strike in the bituminous regions April 1, a number of Connellsville coke operators have found themselves unable to make deliveries at an early date and have withdrawn from the market. It is expected that some of these operators will be back in the market in a few days, but others may be out for a month or more. The price has been advanced 25c., and $4.25 seems to be the lowest obtainable price on high grade foundry coke. By-product coke continues to be quoted at $8.59, delivered New Jersey points, this being on the basis of $4.25 for Connellsville coke at ovens and $4.34 for freight. An advance in the price of by-product coke does not seem to be probable.

Old Material.—The market has been rather inactive during the past week and most dealers are offering slightly lower prices, except for heavy melting steel, which is still fairly firm at $7.50 to $8.00 per ton. Small contracts continue to be made on No. 1 heavy melting steel from time to time. The Lukens Steel Co. is reported to have ordered resumption of shipments on old contracts. The Midvale Steel & Ordnance Co. is paying $12.50 per ton for No. 1 heavy melting steel, delivered Coatesville, and the American Bridge Co. $11.50, Pencoyd. One broker in this district has reduced his buying prices on several items by 50c. per ton. No. 1 railroad wrought iron car axles and wrought iron track all show a slight reduction from the previous week's quotations.

Buying prices per gross ton, New York, follow:

Heavy melting steel, yard	$7.50 to $8.00
Steel rails, short lengths, or equivalent	8.00 to 8.25
Rerolling rails	9.25 to 9.75
Relaying rails, nominal	27.00 to 28.00
Steel car axles	10.00 to 10.50
Iron car axles	17.50 to 18.50
No. 1 railroad wrought	9.50 to 10.00
Wrought iron track	8.00 to 8.50
Forge fire	5.00 to 5.50
No. 1 yard wrought, long	9.00 to 9.50
Cast borings (clean)	7.00 to 7.50
Machine-shop turnings	4.50 to 5.00
Mixed borings and turnings	4.50 to 5.00
Iron and steel pipe (1 in. diam., not under 2 ft. long)	7.25 to 7.75
Stove plate	10.00 to 10.50
Locomotive grate bars	9.00 to 9.50
Malleable cast (railroad)	8.00 to 8.50
Cast-iron car wheels	10.50 to 11.00

Prices which dealers in New York and Brooklyn are quoting to local foundries, per gross ton, follow:

No. 1 machinery cast	$16.50 to $17.00
No. 1 heavy cast (columns, building materials, etc.), cupola size	15.50 to 16.00
No. 1 heavy cast, not cupola size	14.00 to 14.50
No. 2 cast (radiators, cast boilers, etc.)	10.00 to 10.50

Birmingham

BIRMINGHAM, ALA., Feb. 21.

Pig Iron.—More orders were booked by Birmingham iron makers the past week than in many months. The iron goes over a more scattered territory than has been the case since the industrial slump began. Alabama iron is going to more foundries in competitive territories than it has done in practically a year. One maker booked 15 carloads in one day, the total representing 11 different customers from St. Louis, Michigan, Illinois and Indiana to Florida, the Carolinas, Texas and Pacific Coast. The last-named business is on a continuous base and bids fair to remain so pending the excellent ocean rates prevailing. The Sloss-Sheffield Steel & Iron Co.'s initial shipment from its Sheffield stack in extreme northern Alabama to Metropolis for St. Louis, Chicago and Northwestern distribution is scheduled to take place this week and to consist of 1600 tons in 400-ton barges with delivery in 40 hours. This delivery was the experience of the company with the same transportation agency, the Arrow Transportation Co., before the war. This river shipping does not appear to have cut into business in the same territory done by Birmingham makers. St. Louis took several lots last week at $15.50. That was also the base on sales into Michigan and other north of Ohio River points. Pacific Coast business is the choicest, being done on a base of $16. Two operators say they will ship their make and reduce yard stocks this month. One maker booked over 3000 tons in small lots during the week. Most of the business comes without solicitation, the market base of $15.50 appearing to be very generally accepted with $16 charged under certain circumstances. Indications point to greater furnace capacity incident to evidently large melt to be made by the high pressure pipe shops. The feeling in industrial circles is more buoyant than it has been at any time in many months.

We quote per gross ton f.o.b. Birmingham district furnaces as follows:

Foundry, silicon 1.75 to 2.25	$15.50 to $16.00
Basic	14.50 to 15.00
Charcoal, warm blast	32.00

Cast Iron Pipe.—High pressure pipe plants of the National Cast Iron Pipe Co. and the American Cast Iron Pipe Co. are not far from capacity. United States Cast Iron Pipe & Foundry Co. will make the 2000 tons for Portland, Ore., here and ship by Mobile. The Seattle order is also expected here. National Cast Iron Pipe Co. is finishing an order for 1000 tons for Port Arthur, Texas, and has, among other orders, one for 1200 tons for St. Paul. American Cast Iron Pipe Co. booked Wisconsin orders for 1000 tons. A vessel is putting in at Mobile to load with 3000 tons of pipe for the Pacific Coast.

Finishing Mills.—The Tennessee company is shortly to blow in No. 4 blast furnace at Ensley, making five on basic iron there. Open hearth demand continues operation of seven of the nine furnaces.

Coal and Coke.—Demand for coke is stronger and shipments are larger. The price remains at about $5 for standard foundry.

Old Material.—Scrap dealers begin to look for improvement incident to what seems to be a prospect of a real expansion of steel and iron foundry business. Very little business is being done now.

We quote per gross ton f.o.b. Birmingham district yards as follows:

Steel rails	$11.00 to $12.00
No. 1 steel	10.00 to 11.00
No. 1 cast	14.00 to 15.00
Car wheels	13.00 to 14.00
Tramcar wheels	12.00 to 13.00
No. 1 wrought	12.00 to 13.00
Stove plate	11.00 to 12.00
Cast iron borings	6.00 to 7.00
Machine shop turnings	6.00 to 7.00

Buffalo

BUFFALO, Feb. 21.

Pig Iron.—The majority of sales are made at $18.50 base, but in general the volume is small. An inquiry for 5000 tons from outside the district has reached several furnaces and two have responded with the $18.50 price. The average run of orders ranges from carload lots to 200 tons. Generally, inquiry is light and without particular feature. Furnace operation is maintained on the same basis which existed at the beginning of the year and the whole selling object is summed up as that of liquidation rather than doing business on a profitable basis.

We quote f.o.b. per gross ton Buffalo as follows:

No. 1 foundry, 2.75 to 3.25 sil.	$19.50 to $20.00
No. 2X foundry, 2.25 to 2.75 sil.	19.00 to 19.50
No. 2 plain, 1.75 to 2.25 sil.	18.50 to 19.00
Basic	18.00 to 18.25
Malleable	19.50
Lake Superior charcoal	31.75

Warehouse Business.—An increase in the number of orders and in the volume of inquiry within the last 10 days is an encouraging sign. Much of this business is for maintenance work and is indicative of easier conditions in factories and shops. There are many evidences of anxiety to get equipment in good order.

Finished Iron and Steel.—The anticipated adjustment of prices on wire products which buyers believed

would be announced last week but did not develop, had a quieting effect on demand for those products. Sheet inquiry has been brisk, but much of this activity is taken to mean that buyers are circulating requests for prices with a view to finding a break in the uniformity of prices. With all mills quoting $3 on black sheets, there is little advantage in "shopping" and the inquirers who thought they could find a weakness have been disappointed. Bar prices, however, are not as firm. Quotations range from 1.40c. to 1.50c. Some inquiry on irregular sizes has developed, but one agency has declined to bid because mills are not rolling the material sought, and the tonnage is not sufficient to change the roll. Some rod inquiries have been made by nail manufacturers and some requests for prices on reinforcing bars are also out. Structural affairs are quiet; plans for the Buffalo Athletic Club are ready, but structural requirements have not been announced.

We quote warehouse prices f.o.b. Buffalo as follows: Structural shapes, 2.65c.; plates, 2.65c.; plates, No. 8 gage, 3.35c.; soft steel bars and shapes, 2.55c.; hoops and bands, 3.15c.; blue annealed sheets, No. 10, 3.40c.; galvanized steel sheets, No. 28, 5.25c.; black sheets, No. 28, 4.25c; cold-rolled strip steel, 5.90c.; cold-rolled round shafting, 3.40c.

Coke.—Inquiry is lively and is attributed to the strike possibility. Best grades are quoted at $4 to $4.25 ovens.

Old Material.—Because of the light production and the disposition of dealers to retain their stocks for better prices, the market is slow and demand for most materials fairly brisk. The price situation on heavy melting steel is unchanged and dealers willing to sell at $13.50 could find plenty of business. Turnings and borings are also much in demand.

We quote dealers' asking prices per gross ton f.o.b. Buffalo as follows:

Heavy melting steel	$13.00 to $14.00
Low phos., 0.04 and under	17.00 to 18.00
No. 1 railroad wrought	15.00 to 16.00
Car wheels	16.50 to 17.50
Machine shop turnings	7.50 to 8.00
Cast iron borings	7.00 to 8.00
Heavy axle turnings	10.50 to 11.50
Grate bars	12.00 to 13.00
No. 1 busheling	10.00 to 11.00
Stove plate	15.00 to 16.00
Bundled sheet stampings	8.00 to 9.00
No. 1 machinery cast	17.00 to 18.00
Hydaulic compressed	10.50 to 11.50
Railroad malleable	13.00 to 14.00

St. Louis

ST. LOUIS, Feb. 21.

Pig Iron.—The new market price of $20, Chicago, for Northern iron, made rather suddenly in Chicago last week, seems firmly established in this territory. The advance is being followed by producers in Granite City. Sales for the last week, although still largely confined to carloads for immediate shipment, showed an improvement, and there was a better tone to the market, a condition helped by the advance. The $20 price for Northern iron gives Southern iron at $15.50, Birmingham, an advantage of $1.56 a ton, St. Louis, on all-rail shipment, and an even greater advantage on the Sheffield water and rail movement, which affords a saving of 80c., as a differential and $1.50. For the first movement by barge from Sheffield to Metropolis, Ill., and thence by rail, there were two barge loads sold here; one each for Bridge & Beach Mfg. Co., and the Enterprise foundries in Belleville. The largest inquiry pending is for 2000 tons for March and April shipment for an Illinois melter. The Mt. Vernon Car Mfg. Co. has an inquiry out for 1000 to 2000 tons, of which 200 tons is to be delivered during February and the remainder at the rate of 100 tons a week. Another Illinois melter wants 500 tons of foundry iron for March and April shipment.

We quote delivered consumers' yards, St. Louis, as follows, having added to furnace prices $2.80 freight from Chicago and $5.74 from Birmingham:

Northern foundry, sil. 1.75 to 2.25	$22.80
Northern malleable, sil. 1.75 to 2.25	22.80
Basic	22.80
Southern foundry, all rail, sil. 1.75 to 2.25	21.24
Southern foundry, sil. 1.75 to 2.25, rail and water	19.44

Finished Iron and Steel.—The most important development of the week was the announcement of J. M. Kurn, president of the St. Louis & San Francisco Railroad, of plans to expend $7,766,000 on improvements, of which $5,500,000 is to be for track and grade improvements, and more than $2,000,000 for new or re-strengthened equipment. It is planned to spend $1,585,000 for laying of double track, and the laying of 185 miles of new 90-lb. rails at different points and 100 miles of relay rails. Eight 70-ft. all-steel passenger coaches and six 70-ft. all-steel chair cars will be bought at an estimated cost of $435,000. No inquiries covering this material have been issued by the purchasing department of the road. The Union Pacific Railroad bought a carload of wheels, and 100 tons of wire rods also were purchased by a Missouri River concern. The Missouri Pacific Railroad is planning to buy more than 5000 tons of 90-lb. rails. The demand for structural steel here is still light because of the wage situation. Figures submitted for the proposed new Jewish Hospital at Memphis, involving 300 tons of reinforcing bars, are greater than the promoters had expected, and it is likely that new bids will be asked for.

For stock out of warehouse we quote: Soft steel bars, 2.62½c. per lb.; iron bars, 2.62½c.; structural shapes, 2.72½c.; tank plates, 2.72½c.; No. 10 blue annealed sheets, 3.47½c.; No. 28 black sheets, cold rolled, one pass, 4.15c.; cold drawn rounds, shafting and screw stock, 3.65c.; structural rivets, $3.52½ per 100 lb.; boiler rivets, $3.62½; tank rivets 7/16-in. and smaller, 65 and 5 per cent off list; machine bolts, large, 60-10 per cent; small, 60, 10 and 10 per cent; carriage bolts, large, 55-5 per cent; small, 60 and 10 per cent; lag screws, 65-15 per cent; hot pressed nuts, square or hexagon blank, $4; and tapped, $3.75 off list.

Coke.—The business in coke is increasing, although most of the orders being placed are for carloads and for immediate shipment. The most encouraging feature is the steady increase in shipping instructions against contracts, more especially from the producers of lead in the Oklahoma-Kansas-Missouri districts. Granite City by-product producers have renewed contracts for 30,000 tons for shipment over 12 months. Domestic coke is only in fair demand, because of warmer weather.

Old Material.—The situation is unchanged, the market remaining dull and sluggish. The large consumers are still out of the market, and will not make any further purchases this month. Although economy of operation could be effected by unloading old material direct from railroad cars to charging boxes, consumers prefer not to make such cash outlays and are still using their reserve stocks at higher prices. The only railroad list before the market this week was issued by the Texas & Pacific Railway aggregating 1750 tons.

We quote dealers' prices f.o.b. consumers' works, St. Louis industrial district and dealers' yards, as follows:

Per Gross Ton

Old iron rails	$14.00 to $14.50
Steel rails, rerolling	10.50 to 11.00
Steel rails, less than 3 ft.	12.50 to 13.00
Relaying rails, standard section	23.00 to 28.00
Cast iron car wheels	13.50 to 14.00
No. 1 heavy railroad melting steel	10.00 to 10.50
No. 1 heavy shoveling steel	9.75 to 10.00
Ordinary shoveling steel	9.50 to 10.00
Frogs, switches and guards, cut apart	10.00 to 10.50
Ordinary bundle sheet	4.00 to 4.50
Cast steel bolsters	9.50 to 10.00

Per Net Ton

Heavy axles and tire turnings	6.00 to 6.50
Iron angle bars	13.00 to 13.50
Steel angle bars	9.00 to 9.50
Iron car axles	18.00 to 18.50
Steel car axles	12.50 to 13.00
Wrought iron arch bars and transoms	15.00 to 15.50
No. 1 railroad wrought	9.50 to 10.00
No. 2 railroad wrought	8.50 to 9.00
Railroad springs	10.00 to 10.50
Steel couplers and knuckles	10.00 to 10.50
Locomotive tires, 42 in. and over, smooth inside	8.00 to 8.50
No. 1 dealer's forge	8.00 to 8.50
Cast iron borings	5.50 to 6.00
No. 1 busheling	8.50 to 9.00
No. 1 boilers cut in sheets and rings	6.00 to 6.50
No. 1 railroad cast	12.00 to 12.50
Stove plate and light cast	11.00 to 11.50
Railroad malleable	8.50 to 9.00
Agricultural malleable	9.00 to 9.50
Pipes and flues	7.50 to 8.00
Heavy railroad sheet and tank	5.50 to 6.00
Light railroad sheet	3.50 to 4.00
Railroad grate bars	9.50 to 10.00
Machine shop turnings	3.00 to 3.50
Country mixed iron	6.00 to 6.50
Uncut railroad mixed	7.00 to 7.50
Horseshoes	9.50 to 10.00
Railroad brake shoes	9.50 to 10.00

Cleveland

CLEVELAND, Feb. 21.

Iron Ore.—The first ore sale reported for this season was made during the week, this being 1500 tons of manganiferous ore which was bought by a St. Louis consumer. The purchaser will pay whatever market price is established later in the season. Recently a sale of 10,000 tons of manganiferous ore was made for use in manufacturing spiegel, but this was a resale lot to be shipped from Lake Erie docks. Mining companies are making estimates of probable mining costs for the season with a view of arriving at conclusions as to what ore prices should be. Some of the independent mining companies that are paying wage scales below those of the Steel Corporation regard their present wage scales as a temporary expedient in order to keep the men at work and say they will probably use the Steel Corporation's wage schedule as a basis for figuring mining costs.

We quote delivered lower lake ports: O'd range Bessemer, 55 per cent iron, $6.45; Old range non-Bessemer, 51½ per cent iron, $5.70 Mesabi Bessemer, 55 per cent iron, $6.20; Mesabi non-Bessemer, 51½ per cent iron, $5.55.

Pig Iron.—Sales increased during the week and included some good-sized orders. The action of Chicago producers in marking up prices has resulted in a stiffening by one lake furnace, but this appears to be mostly on iron for shipment to points at which Chicago furnaces can enter competition, as this producer is still quoting foundry iron at $18.50 in some cases. With this market firmness in one direction, lake furnaces apparently will meet keener competition with southern iron in central and southern Ohio, as further concession of 50c. a ton has been made in Alabama iron on the inquiry from the Standard Sanitary Mfg. Co. for its Louisville plant, which brought out a $15 base price. On foundry iron $19 appears to be the more general quotation by lake furnaces except for delivery to points where competition is sharpest. The Standard Sanitary Mfg. Co. has purchased 1000 tons and the United States Sanitary Co. 300 tons of foundry iron from a Valley furnace, both at $19 and we also note the sale of 1000 tons of foundry iron to a Michigan automobile foundry and 1000 tons of malleable iron to an Ohio foundry at the same price. A lake furnace that booked the two last mentioned orders also sold about 4000 tons additional during the week in small lots. Locally the demand has increased, a number of small foundries buying small lots at $19.50 to $20 at furnace. Sales of three lots of Ohio silvery iron aggregating 500 tons were made to Cleveland foundries at the new price. Shipments continue to improve and one producer expects that its February shipments will be 50 per cent greater than in January. The Hanna Furnace Co. blew in its Dover furnace Feb. 18 and Pickands, Mather & Co. will put their Perry furnace at Erie, Pa., in blast this week.

Quotations below are f.o.b. local furnace for Northern foundry iron, not including a 56c. switching charge. Other quotations are delivered Cleveland, being based on a $1.96 freight rate from Valley points, a $3.36 rate from Jackson and a $6.67 rate from Birmingham:

Basic		$19.71
Northern No. 2 fdy., sil. 1.75 to 2.25	$19.00 to	20.00
Southern fdy., sil. 1.75 to 2.25	21.67 to	22.17
Ohio silvery, sil. 8 per cent		30.86
Standard low phos., Valley furnace		32.00

Finished Materials.—The demand for finished materials shows a further improvement and has broadened, orders being well scattered from various manufacturing industries. Fabricating shops which have been buying plates and shapes only for specified work are now adding some additional material for stock. The price situation shows little change. On steel bars, plates and structural material 1.40c. is the minimum price and that is being quoted only on the more desirable orders, the greater percentage of the business being booked at 1.45c. to 1.50c. The structural outlook continues to improve. The Fort Pitt Bridge Works has taken 350 tons for the auditorium for the National Cash Register Co., Dayton, and bids have been taken for 500 tons for a building for the Commercial Savings Bank & Trust Co., Toledo. An inquiry has come out for 600 tons for the Kresge Store Building, Cleveland. Lake shipyards have received another inquiry for a freight boat, this making three inquiries now pending for lake boats, each involving 4000 tons of steel. Some business is coming from the automotive industry and among the week's orders was one for 420 tons of spring steel.

Jobbers quote steel bars, 2.36c.; plates and structural shapes, 2.46c.; No. 9 galvanized wire, 3c.; No. 9, annealed wire, 2.50c.; No. 28 black sheets, 3.75c.; No. 28 galvanized sheets, 4.75c.; No. 10 blue annealed sheets, 3.10c.; hoops and bands, 2.96c.; cold-rolled rounds, 3.25c.; flats, squares and hexagons, 3.75c.

Sheets.—The improvement noted in other lines has not extended to the sheet market, which is quiet. While regular prices are holding well there is an occasional report of a concession to 3.75c. on galvanized sheets.

Warehouse Business.—Local warehouses have reduced prices on wire and nails. Warehouse orders show an improvement.

Bolts, Nuts and Rivets.—The demand for bolts and nuts has improved materially, but buying is mostly in small lots. A broadening is noted in the demand. Some orders are now coming from the implement manufacturers. Prices still lack firmness. The leading local rivet manufacturer reduced prices Feb. 18 $3 a ton, making structural rivets 2.10c. and boiler rivets 2.20c. Some makers had recently shaded prices to this extent. Small rivets are weak, quotations of 75 and 10 per cent off list appearing.

Coke.—Prices have stiffened slightly, but the demand has quieted. We quote standard Connellsville foundry coke at $4 to $4.50.

Old Materials.—The improvement in steel plant operations has not resulted in any better demand for scrap and the market was unusually dull during the week. Prices are still inclined to weakness, this being particularly true of blast-furnace scrap. Prices on borings and turnings have declined about 25c. a ton. There is a limited demand from Cleveland dealers for turnings to fill old orders with a local mill and they are offering $9 for this grade. Some inquiry has come from Pittsburgh foundries for prices on couplers, knuckles and coil springs. These prices are to be used as a basis for quoting prices on railroad castings.

We quote per gross ton, f.o.b. Cleveland, as follows:

Heavy melting steel	$12.00 to	$12.50
Steel rails, under 3 ft.	12.50 to	13.00
Steel rails, rerolling	14.00 to	14.50
Iron rails	12.00 to	12.50
Iron car axles	18.00 to	19.00
Low phosphorus melting	13.00 to	13.50
Cast borings	9.00 to	9.25
Machine shop turnings	8.50 to	8.75
Mixed borings and short turnings	8.50 to	8.75
Compressed steel	9.00 to	9.50
Railroad wrought	12.00 to	12.50
Railroad malleable	12.50 to	13.00
Light bundled sheet stampings	6.00 to	7.00
Steel axle turnings	9.50 to	10.00
No. 1 cast	15.00 to	16.00
No. 1 busheling	8.75 to	9.00
Drop forge flashings, over 10 in.	7.75 to	8.00
Drop forge flashings, under 10 in.	9.00 to	9.25
Railroad grate bars	12.75 to	13.00
Stove plate	13.00 to	13.25
Pipes and flues	8.50 to	9.00

J. C. Reed has organized the Reed Railway Supply Co., of which he is president, with offices in the Railway Exchange Building and warehouse at Main and Chestnut streets, St. Louis. Mr. Reed was the president of the Southern Hardware & Supply Co., which was purchased recently by Geller, Ward & Hasner Hardware Co. T. W. Meloan is vice-president, and T. B. Fitzwilliam, secretary of the company, which will have a capital stock of $50,000.

Effects of modern sales and advertising methods upon stabilization is the subject of a meeting to be held at the Auditorium Hotel, Chicago, on March 14, by the Society of Industrial Engineers, George C. Dent, 327 South La Salle Street, Chicago, manager.

The Lebanon Drop Forge Co., Lebanon, Pa., has taken over the Rivetless Chain & Engineering Co., with local plant, and will merge the organization under its present name. The consolidated company will operate with a capital of $165,000.

Philadelphia

PHILADELPHIA, Feb. 21.

More replenishment buying of steel products has marked the past week's business in this market and has created a somewhat more hopeful feeling among steel companies. Steel bars, spring steel and galvanized wire have been the principal beneficiaries of improved buying and the demand has come both from jobbers and from manufacturing consumers. Detroit automobile manufacturers have furnished a goodly share of the business. In a minor degree, there has also been better buying of plates and structural shapes. Some plate consumers who have not been buyers in many months have placed orders within the past week. A better demand for light rails is also a feature.

Pig iron buying is not large, but there is a better volume of inquiry. Most of the wants are immediate, there being little or no indication at the moment of interest in speculative buying by foundries. In steelmaking iron, there is practically no interest.

Prices continue weak with the trend downward whenever changes occur. Eastern blast furnaces are conceding something from their f.o.b. furnace prices when necessary to meet competitive delivered prices, or in other words they are absorbing a part of the freight rate. In steel products the principal change is in wire products, which are now quoted quite generally at $2 below the recent levels, wire nails selling at $2.40 per 100 lb. keg, Pittsburgh, plain wire at $2.15 and galvanized wire at $3.05. Bars, plates and shapes continue at 1.40c., Pittsburgh, but shading of this price on plates is reported. Sheets remain firm despite weakness of other steel products. Light rails are selling at 1.40c. per lb., Pittsburgh. A recent large sale of structural rivets was made at about 2c., Pittsburgh, which is $5 a ton below recent so-called regular quotations.

Pig Iron.—There is comparatively little buying of iron, but prospects are somewhat brighter due to a greater number of inquiries received in the past few days. Most of these inquiries are for replenishment only, there being little or no interest among users of foundry iron in speculative buying. The quantities inquired for are small, ranging from a carload to 200 or 300 tons. The only important sales of the week were of gray forge iron, which totaled 3500 or 4000 tons, the buyers being two cast iron pipe companies and a maker of iron plates. Sales were made at prices ranging from $19 to $19.50, furnace, but the delivered prices were almost identical at $20.50. Foundry iron delivered prices are unchanged, but furnaces show a disposition to meet competition by absorbing, when necessary, a part of the freight rate. A New Jersey foundry received several identical bids of $21.76, delivered, on No. 2X iron, but the f.o.b. furnace prices in one or two instances were close to $19.50. There is no interest in steelmaking iron.

The following quotations are, with the exception of those on low phosphorus iron, for delivery at Philadelphia, and include freight rates varying from 84 cents to $1.54 per gross ton:

East. Pa. No. 2 plain, 1.75 to 2.25 sil.	$20.84 to $21.26
East. Pa. No. 2X, 2.25 to 2.75 sil.	21.34 to 21.76
Virginia No. 2 plain, 1.75 to 2.25 sil.	27.24 to 27.74
Virginia No. 2X, 2.25 to 2.75 sil.	27.74 to 28.24
Basic delivery eastern Pa.	19.84
Gray forge	20.50 to 21.50
Malleable	22.50 to 24.00
Standard low phos. (f.o.b. furnace)	30.00
Copper bearing low phos. (f.o.b. furnace)	28.00

Ferroalloys.—The advance to $62.50, Atlantic seaboard, on both British and domestic ferromanganese has checked buying. Practically no business has been closed since the price was advanced, several buyers having covered at the former price just previous to the rise. There is very little demand for spiegeleisen, which is nominally quoted at $30 for the lower grade, 16 to 19 per cent. The higher grade, 20 to 22 per cent, is scarce.

Billets.—On the small tonnages of rerolling billets which make up the bulk of current business, the usual price is $28, Pittsburgh, but this could be shaded on larger tonnages. Forging billets have been sold within the week at $32, Pittsburgh. There are reports of recent substantial sales of rerolling billets for shipment to England.

Plates.—An Eastern plate mill reports that its bookings of orders in the past week constitute the largest week's business in many months. Some consumers who have not been in the market in a long time placed fairly good orders, mostly for boiler steel. On the whole, however, the demand for plates leaves much to be desired. Prices are weak, and there are reports that 1.40c., Pittsburgh, has been shaded on desirable tonnages. Most any order from a carload upward can easily be placed at 1.40c., and only the less-than-carload lots fetch as high as 1.50c. An Eastern fabricator bidding on the proposed Castleton bridge of the New York Central Railroad is inquiring for 10,000 to 12,000 tons of plates, half sheared and half universal. Deliveries are wanted over a three months' period. This is the largest inquiry before the trade, most of the inquiry and buying involving lots of 500 tons and less. The Philadelphia & Reading Railroad last week distributed orders for 800 tons of tank steel for car repairs among three or four mills.

Structural Material.—A better run of small orders is reported by some of the Eastern mills. Building activity in Philadelphia is not extensive, though many rather indefinite projects are talked of. Fabricators have no difficulty in getting protection at 1.40c., Pittsburgh.

Bars.—In steel bars there has been a marked betterment. Orders have come in freely within the past week or 10 days from jobbers and manufacturers. The Detroit district has furnished considerable business. Spring steel as well as soft steel bars has been ordered. The bar mills of the Cambria plant at Johnstown, Pa., are running close to 90 per cent of capacity, although the plant as a whole is not exceeding a 45 per cent operation. Steel bars are being sold freely at 1.40c., Pittsburgh. In bar iron the same price obtains, with the possible exception that it might be difficult to buy large flats and rounds at less than 1.45c.

Sheets.—Prices on sheets continue firm, being the exception among steel products. There is, however, little inquiry in this district to test the market. Blue annealed is quoted at 2.25c., black at 3c. and galvanized at 4c., Pittsburgh.

Wire Products.—Practically all makers of wire products have now reduced prices $2 a ton as a result of the cutting which has been going on for some weeks. Wire nails are quoted at $2.40, plain wire at $2.15 and galvanized wire at $3.05, all per 100 lb., Pittsburgh. A fairly good demand is reported, particularly for galvanized wire.

Light Rails.—The demand for light rails has improved, but prices are weak. Sales have been made as low as 1.40c. per lb., Pittsburgh, though some mills are asking 1.45c. and 1.50c.

Rivets.—A recent large purchase of structural rivets, approximately 500 tons, was consummated at a price about 2c. per lb., Pittsburgh, which is $5 a ton below so-called regular quotations.

Old Material.—There was a little better buying of scrap in the past week, but tonnages wanted were small. Prices are unchanged. For delivery at consumers' works in this district we quote:

No. 1 heavy melting steel	$12.00 to $12.50
Scrap rail	12.00 to 12.50
Steel rails, rerolling	15.00 to 15.50
No. 1 low phos., heavy 0.04 and under	18.00 to 19.00
Cast iron car wheels	15.00 to 15.50
No. 1 railroad wrought	14.50 to 15.00
No. 1 yard wrought	12.00 to 12.50
No. 1 forge fire	10.00 to 10.50
Bundled sheets (for steel works)	9.50 to 10.00
No. 1 busheling	11.00 to 12.00
No. 2 busheling	9.00 to 10.00
Turnings (short shoveling grade for blast furnace use)	9.50 to 10.00
Mixed borings and turnings (for blast furnace use)	9.50 to 10.00
Machine-shop turnings (for rolling mill and steel works use)	9.50 to 10.00
Heavy axle turnings (or equivalent)	9.50 to 10.00
Cast borings (for steel works and rolling mills)	12.00 to 12.50
Cast borings (for chemical plants)	13.50 to 14.00
No. 1 cast	16.50 to 17.00
Railroad grate bars	14.00 to 14.50
Stove plate (for steel plant use)	14.00 to 14.50
Railroad malleable	12.50 to 13.50
Wrought iron and soft steel pipes and tubes (new specifications)	12.00 to 12.50
Iron car axles	No market
Steel car axles	17.00 to 18.50

Warehouse Business. — Moderate improvement in buying of steel out of stock continues. Prices locally on plates and shapes are lower. We quote for Philadelphia delivery as follows:

Soft steel bars and small shapes, 2.50c.; iron bars (except bands), 2.50c.; round edge iron, 2.80c.; round edge steel, iron finish, 1½ x ½ in., 2.95c.; round edge steel planished, 3.10c.; tank steel plates, ¼-in. and heavier, 2.50c.; tank steel plates, 3/16-in., 2.55c.; blue annealed steel sheets, No. 10 gage, 3.50c; light black sheets, No. 28 gage, 4c.; galvanized sheets, No. 28 gage, 5c.; square twisted and deformed steel bars, 2.65c.; structural shapes, 2.50c.; diamond pattern plates, ¼-in., 4.60c.; 3/16-in., 4.785c.; ¼-in., 4.50c.; spring steel, 4.10c.; round cold-rolled steel, 3.25c.; squares and hexagons, cold-rolled steel, 3.75c.; steel hoops, No. 13 gage and lighter, 3.25c.; steel bands, No. 12 gage to 3/16-in., inclusive, 3.10c.; iron bands, 3.90c.; rails, 2.75c.; tool steel, 8c.; Norway iron, 5c.; toe steel, 4.50c.

Boston

BOSTON, Feb. 21.

Pig Iron.—Business in pig iron suffered a relapse this week, orders booked consisting of a carlot here and there, the aggregate tonnage involved being unimportant. The Gurney Heater Co., Framingham, Mass., inquiring on 2000 tons of No. 2 X, has withdrawn, temporarily, from the market. The largest prospective inquiry is for 500 tons, silicon 2.75 to 3.25, to be put out within the immediate future by a maker of textile machinery. In the absence of business, Buffalo irons appear firmer. One furnace heretofore offering silicons up to and including 3.25 at $18, furnace, this week is quoting $19 on small tonnages and $18.50 on large. Other furnaces quote $18.50, which suggests a recovery of at least 50c. Eastern Pennsylvania furnace interests are meeting $19, Buffalo delivered, iron. The market on such irons therefore cannot be considered firmer. Some Virginia and Alabama iron is coming into this territory, but hardly enough to constitute a real market.

We quote delivered at common New England points as follows, having added to furnace prices $4.06 freight from eastern Pennsylvania, $5.46 from Buffalo, $6.58 from Virginia and $10.66 from Alabama:

East Penn., sil. 2.25 to 2.75	$23.06 to $24.56
East Penn., sil. 1.75 to 2.25	23.06 to 24.06
Buffalo, sil. 2.25 to 2.75	23.96 to 24.46
Buffalo, sil. 1.75 to 2.25	23.96 to 24.46
Virginia, sil. 2.25 to 2.75	29.08 to 30.08
Virginia, sil. 1.75 to 2.25	28.58 to 29.58
Alabama, sil. 2.25 to 2.75	27.16
Alabama, sil. 1.75 to 2.25	26.66

Cast Iron Pipe.—The Metropolitan District Commission, Boston, this week placed the largest single order for cast iron pipe noted in this territory for several months. From the Warren Foundry & Machine Co.it purchased 3150 tons of 20-in, 24-in. and 30-in. pipe, and from the United States Cast Iron Pipe & Foundry Co. 50 tons of fittings for 20-in. and 30-in. pipe, deliveries to begin at once and to terminate on or before May 1. The city of Portland, Me., has placed an order for approximately 1800 tons of 6-in. to 12-in. pipe and 35 tons of fittings with the Warren Foundry & Machine Co., for delivery up to May 1. A large tonnage of additional business is in the making, but prospective buyers are slow in making up lists. Representatives of pipe makers report books well filled with orders. Prices are firm and unchanged, as follows: per net ton, f.o.b. Boston and district, in carload lots, 3-in., $66.70; 4-in., $56.70; 6-in., $50.70; 10-in. and larger, $49.70, with $4 differentials on Class A and gas pipe. Bids will be opened March 1, by the city of Boston, on 2150 tons 6 in. to 36 in. pipe, Boston specifications. R. D. Wood & Co. have secured approximately 800 tons of gas pipe from Stone & Webster, Boston.

Warehouse Business.—Further increases in the movement of iron and steel out of warehouses is noted, with the greatest activity in sheets and structural steel. The average order for bars involves small weights, and the increase in the movement out of stock is due entirely to an increase in the number of orders received daily. An improvement in the demand for bolts and nuts also is noted, but business is spotty. Local quotations on wire nails have been reduced 15c. to $3.25 per keg base.

Finished Material.—The New England Structural Co. has been awarded 600 tons of structural steel for the Beacon Press Co., Boston, building, and 200 tons for an Allston theater, and the American Bridge Co. the steel for a $100,000 Holyoke, Mass., silk mill. Bids are being taken on 3000 tons for a Park Square, Boston, building, 240 tons for a Manchester, N. H., theater and 138 tons for a Winter Street, Boston, building, as well as on approximately 5000 tons for other projects, negotiations for which are private, all to be awarded presumably within the next fortnight. Mill representatives report business running well ahead of last month on bars, bands, plates, sheets and structural steel for stocking purposes. The Bangor & Aroostook Railroad has bought 2000 tons 80-lb. rails from the Bethlehem Steel Co., and 7400 standard angle joints. The Maine Central Railroad 3000-ton rail inquiry remains open.

Jobbers now quote: Soft steel bars, $2.55½ per 100 lb. base; flats, $3.05½; concrete bars, stock lengths, $2.55½; structural angles and beams, 2.65½; plates, $2.65½ to $2.83; tire steel, $3.85 to $4.25; open hearth spring steel, $4.50; crucible spring steel, $11.50; bands, $3.15½ to $3.53; hoop steel, $3.15½; cold rolled steel, $3.40 to $3.90; toe calk steel, $8; refined iron, $2.55½ per 100 lb. base; best refined iron, $4.25; Wayne iron, $5.50; Norway iron, $5.50; No. 10 blue annealed sheets, $3.48 per 100 lb. base; No. 28 black sheets, $4.50; No. 28 galvanized sheets, $5.50.

Coke.—Daily shipments of by-product foundry coke by the New England Coal & Coke Co. and the Providence Gas Co. continue to run well ahead of those for the corresponding period last month. While business is better than it was, the above mentioned companies have not found it necessary to increase oven production. The buying is in anticipation of labor troubles at the coal mines April 1, rather than because of any marked increase of foundry operations. Only an occasional car of Connellsville foundry coke is finding its way into this territory. Prices are reported as firm by both New England producers on a basis of $10.15, delivered, where the local freight does not exceed $3.40.

Old Material.—Little of interest developed in the old material market the past week. New England users, as well as Pennsylvania mills, showed the same indifference they did during the previous week. In the absence of business, prices are largely nominal and therefore not subject to change. The demand for borings, the outstanding feature of the market during the latter part of January, appears to have dried up, yet dealers are quoting on the former basis. The low cost of pig iron and the low operating ratio of the average foundry in this territory account in a large measure for the inactivity of machinery cast.

The following prices are for gross ton lots delivered consuming points:

No. 1 machinery cast	$18.00 to $18.50
No. 2 machinery cast	16.00 to 16.50
Stove plate	15.00
Railroad malleable	13.00 to 13.50

The following prices are offered per gross ton lots f.o.b. Boston rate shipping points:

No. 1 heavy melting steel	$8.00 to $9.00
No. 1 railroad wrought	10.50 to 11.00
No. 1 yard wrought	9.50 to 10.00
Wrought pipe (1-in. in diam., over 2 ft. long)	7.00 to 7.25
Machine shop turnings	4.00 to 4.50
Cast iron borings, rolling mill	7.50 to 8.00
Cast iron borings, chemical	8.50 to 9.00
Blast furnace borings and turnings	3.50 to 4.50
Forged scrap and bundled skeleton	4.50 to 5.00
Street car axles and shafting	10.50 to 11.00
Car wheels	11.50 to 12.00
Rerolling rails	10.00 to 10.50

Bids on the Navy's Copper and Brass Scrap

WASHINGTON, Feb. 20.—Submitting figures ranging from 7.0199c. to 9.3899c. per lb., Herman Jaffe, 220 Broadway, New York, was the highest bidder for 9 out of 11 lots of copper and brass scrap offered for sale by the Navy Department, tenders being opened this morning. The total quantity involved was 1,000,000 lb. The biggest lot included in Mr. Jaffe's bids was 500,000 lb. of reclaimed copper composition scrap ingots at Norfolk, Va., this material containing 81.5 per cent copper, 7.46 per cent tin and 9.51 per cent zinc with minor contents of other non-ferrous material. The price offered for this lot was 8.5699c. per lb. The highest individual bid was 9.76c. per lb., made by the U. T. Hungerford Brass & Copper Co., New York, for 25,000 lb. of brass primer rods at Newport, R. I. Besides the Norfolk and Newport navy yards the material offered for sale is located at the Hingham, Mass., and Portsmouth, N. H., yards. There were nine bidders in all.

Chicago

CHICAGO, Feb. 21.

Railroad purchases of cars and track material during the past month together with recent releases against rail contracts, have had their effect on local mill operations, which now average well over 50 per cent. The Illinois Steel Co. has put in another blast furnace at Joliet, giving it 11 active stacks in all, and is producing steel at the rate of 55 per cent of ingot capacity. The Inland Steel Co. is on a 60 per cent basis, having its entire No. 1 plant in operation and having started three open hearths and its 40-in. blooming mill and 32-in. roughing mill on the No. 2 side.

Much of the business which made these gains in production possible was taken at a sacrifice. This was particularly true of orders taken from car builders and railroads which involved large tonnages. Because of the mills' anxiety to build up a backlog, the advantage was clearly with the buyers and in some instances exceptionally low prices resulted. Recent orders for car steel have gone at 1.40c., Chicago, and even lower, one sale having been made at that price with a freight of 17c. allowed to the point of delivery. Likewise a large railroad order for tie plates was placed at less than $30, mill. Mills profess to be sick of low-priced business, however, and are showing a firmer attitude on new inquiries. Even at 1.50c., Chicago, it is asserted no profit can be made on plates, shapes and bars. As producers are now fortified with substantial backlogs, it seems probable that the necessity for cutting so far below costs has passed.

Pig Iron.—Buying has been light since the advance in local irons, but such purchases as have been made, ranging from carload lots to 200 tons, have been at $20 base. Here and there some Southern iron has been sold in this district, but as yet the tonnage has not been large. Although orders have fallen off sharply, some good-sized inquiries are current. The Mt. Vernon Car Mfg. Co. wants 1000 to 2000 tons of malleable for February and March shipment, while a Milwaukee melter is in the market for 2000 tons of Northern and 400 tons of Southern foundry for delivery in the next 60 days. The American Brake Shoe & Foundry Co. is inquiring for 300 tons of foundry for April shipment at the Southern Wheel Co. plant, St. Louis. The Western Electric Co. is negotiating for an additional 300 tons of 3 per cent foundry for March and April shipment. A current local inquiry for 250 tons of low phosphorous is expected to bring out keen competition. Copper free material appears to have firmed up to $30, Valley furnace, but copper bearing is available at $2 less. We note several sales of carload lots of charcoal at $27 base, furnace, and one carload sale at $28 base. While most producers are now insisting on a minimum of $28, at least one maker is still offering material at the lower price.

Quotations on Northern foundry, high phosphorus malleable and basic irons are f.o.b. local furnace and do not include a switching charge averaging 70c. per ton. Other prices are for iron delivered at consumers' yards, or when so indicated, f.o.b. furnace other than local.

Lake Superior charcoal, averaging sil. 1.50, delivered at Chicago	$30.50 to $31.50
Northern coke, No. 1, sil. 2.25 to 2.75	20.50
Northern coke, foundry, No. 2, sil. 1.75 to 2.25	20.00
Northern high phos	20.00
Southern foundry, sil. 1.75 to 2.25	21.67
Malleable, not over 2.25 sil	20.00
Basic	20.00
Low phos., Valley furnace, sil. 1 to 2 per cent copper free	30.00
Silvery, sil. 8 per cent	32.82

Ferroalloys.—Spiegeleisen has been advanced to $30, Eastern furnace, or $40.10 delivered. Furnace stocks are low and consist largely of 16 to 18 per cent material. Several sales of ferromanganese, ranging from one to two carloads, have been made at the new price of $62.50, seaboard. A local steel works has bought 300 tons of 10 per cent Bessemer ferrosilicon at $34 delivered.

We quote 78 to 82 per cent ferromanganese, $70.90, delivered; 50 per cent ferrosilicon, $56 to $57.50, delivered; spiegeleisen, 16 to 18 per cent, $40.10, delivered.

Railroad Equipment.—The Great Northern has ordered 500 refrigerator cars from the General American Car Co. It has deferred action on its box car inquiry and has reduced its gondola inquiry to 250 cars. It is expected to close presently on the gondolas and 500 stock cars.

Bars.—Business in soft steel bars is still expanding, although not sufficiently as yet to stiffen prices, which range from 1.50c. to 1.60c., Chicago, on ordinary orders. The sources of new business are growing more diversified from day to day, although large individual tonnages continue to be placed mainly for car construction and for reinforcing purposes. The Kansas City Bolt & Nut Co. will furnish 1100 tons of reinforcing for a building to be erected for the Kansas City Warehouse & Cold Storage Co. The Concrete Steel Co. has the contract for 800 tons for the Phoenix Knitting Co. plant, Milwaukee. The reinforcing for the Putnam Department Store, Davenport, Iowa, amounting to 135 tons, has been let to the Corrugated Bar Co. The Milwaukee Sewerage Commission has not yet made a formal award of the 5000 tons for the Jones Island disposal plant. Reinforcing jobs pending include 300 tons for the Churchill Hotel, Chicago, 300 tons for the Popular Mechanics Building, Chicago, and 120 tons for state highway work in Bureau County, Ill.

Bar iron demand is light and prices are weak at from 1.55c. to 1.60c., Chicago.

Mill prices are: Mild steel bars, 1.50c. to 1.60c., Chicago; common bar iron, 1.50c. to 1.60c., Chicago; rail carbon, 1.50c., mill or Chicago.

Jobbers quote 2.53c. for steel bars out of warehouse. The warehouse quotation on cold-rolled steel bars and shafting is 3.40c. for rounds and 3.90c. for flats, squares and hexagons. Jobbers quote hard and medium deformed steel bars at 1.90c. base. Hoops and bands, 3.13c.

Sheets.—Domestic demand is slow to improve, but local mills have export business to fall back upon to fill up holes in their rolling schedules. Prices are fairly firm. The local independent is running at capacity with over a month's work ahead.

Mill quotations are 3c. for No. 28 black, 2.25c. for No. 10 blue annealed and 4c. for No. 28 galvanized, all being Pittsburgh prices, subject to a freight rate to Chicago of 38c. per 100 lb.

Jobbers quote: Chicago delivery out of stock, No. 10 blue annealed, 3.38c.; No. 28 black, 4.15c.; No. 28 galvanized, 5.15c.

Wire Products.—Buying is of unsatisfactory volume for this time of the year and prices are unsteady. For mill prices see finished iron and steel, f.o.b. Pittsburgh, page 559.

We quote warehouse prices f.o.b. Chicago: No. 9 and heavier black annealed wire, $3.13 per 100 lb.; No. 9 and heavier bright basic wire, $3.28 per 100 lb.; common wire nails, $3.25 per 100 lb.; cement coated nails, $2.65 per keg.

Steel Castings.—The castings for the Burlington cars have not yet been let. Owing to the substitution of rolled steel construction for some car parts ordinarily supplied by the steel foundries, the tonnage of castings to be bought will not be so large as was expected. The castings market is generally quiet, although the prospect of further car lettings is encouraging. Figures submitted on a number of recent inquiries indicate a tendency toward firmness and a rather general adherence to prices which approximate those published on pages 348 to 350 of THE IRON AGE of Feb. 2, although the manner of quoting was in some cases different.

Plates.—Demand continues to broaden with orders coming from widely distributed sources. While the individual tonnages are generally small, their increasing number is regarded as an indication of growing confidence in the present market level as well as a gradual improvement in general industrial activity. While prices are still soft, ranging from 1.50c. to 1.60c., Chicago, on the general run of business, the tendency is toward greater firmness on the part of sellers. Further railroad car business has been let with more in sight, but little new work of consequence is being undertaken by the oil industry. The only recent oil tank job placed was a small one, consisting of 10 station tanks, involving 400 tons, to be fabricated and erected in this city for the Standard Oil Co. by the Graver Corporation.

The ruling mill quotations range from 1.50c. to 1.60c., Chicago. Jobbers quote 2.63c. for plates out of stock.

Rails and Track Supplies.—Track supplies are in active demand and specifications against rails on contract are heavier. The New York Central has placed 12,000 kegs of spikes, as well as some bolts and angle bars with the Illinois Steel Co. The Big Four is in the market for 6000 tons of tie plates. Recent inquiries for tie plates have brought out keen competition, the going market price of $35 per net ton having been shaded in one or two instances. New rail orders reported include 3000 tons bought by the Hocking Valley from the Lackawanna Steel Co. and 2500 tons placed with the Gary mill by the Monon. The latter road has also released 2000 tons on contract. Altogether releases received by the Gary mill during the week totaled 20,000 tons, including 8000 tons for the Great Northern and substantial tonnages for the Baltimore & Ohio and the Missouri Pacific. The demand for light rails is light and prices range from 1.50c. to 1.60c., mill.

Standard Bessemer and open-hearth rails, $40; light rails rolled from new steel, 1.50c. to 1.60c., f.o.b. makers' mills.

Standard railroad spikes, 2.10c., Pittsburgh; track bolts with square nuts, 3.10c., Pittsburgh; tie plates, steel and iron, 1.75c., f.o.b. mill; angle bars, 2.40c., f.o.b. mill.

Bolts and Nuts.—Both jobbers and consumers are buying a little more freely, but bookings are still exceedingly unsatisfactory and discounts remain very weak.

Jobbers quote structural rivets, 3.43c.; boiler rivets, 3.53c.; machine bolts up to ⅞ x 4 in., 60, 10 and 10 per cent off; larger sizes, 60 to 10 off; carriage bolts up to ⅞ x 6 in., 60 and 10 off; larger sizes, 55 and 5 off; hot pressed nuts, square and hexagon tapped, $3.75 off; blank nuts, $4 off; coach or lag screws, gimlet points, square heads, 65 and 5 per cent off. Quantity extras are unchanged.

Structural Material.—There are few new lettings to report and while much fabricating work is in the formative stage, it is slow in getting to the bid-taking stage. Prices on plain material are still weak and the general market appears to range from 1.50c. to 1.60c., Chicago. Fabricating awards include:

Sun Drug Co. Building, Los Angeles, 600 tons, to Llewellyn Iron Works. Michigan State Highway Department, one 150-ft. through truss span near Rockland, Mich., 112 tons, to unnamed fabricators. Repairs to south approach Missouri River Bridge, Sioux City, Iowa, 200 tons, to American Bridge Co.

Pending business includes:

Northern Pacific Railway, miscellaneous spans for distribution over entire system, 1922 requirements, 2900 tons.

Central Y. M. C. A. building, Columbus, Ohio, 500 tons, bids in.

London Guarantee Life Assurance Building, Chicago, 4400 tons, general contractor's bids in.

Shrine Auditorium, Indianapolis, 350 tons.

Wisconsin Highway Commission bridge, Tomahawk, Wis., 278 tons, Stein Construction Co., Milwaukee, general contractor.

Jones Island Sewage Disposal Plant, Milwaukee, 450 tons, bids to be opened by John H. Fowles, City Hall, March 10.

The mill quotation on plain material ranges from 1.50c. to 1.60c., Chicago. Jobbers quote 2.63c. for plain material out of warehouse.

Cast-Iron Pipe.—The People's Gas Co., Chicago, has placed 9000 tons of gas pipe with the United States Cast Iron Pipe & Foundry Co., and the Milwaukee Gas Co. has awarded 500 tons to the Lynchburg Foundry Co. Other lettings include:

Brook Park, Ohio, 600 tons of water pipe to the National Cast Iron Pipe Co. Fairfax, Okla., 175 tons, to National Cast Iron Pipe Co. Muscatine, Iowa, 650 tons, to United States Cast Iron Pipe & Foundry Co. Detroit Fire Commissioners, 300 tons of high pressure pipe, to United States Cast Iron Pipe & Foundry Co. Minneapolis, 800 tons, to American Cast Iron Pipe Co.

Pending business includes:

Toledo City, Ohio, 350 tons, bids in Feb. 28, contractor's job. Wausau, Wis., 200 tons, Feb. 18. Madison, Wis., 150 tons, Feb. 18. Moulton, Iowa, 300 tons, Feb. 23. Stratton, Col., 200 tons, Feb. 23. Cody, Wyo., 325 tons, Feb. 24. Muskegon, Mich., 150 tons, Feb. 24.

We quote per net ton, f.o.b. Chicago, as follows: Water pipe, 4-in., $45.60 to $46.60; 6-in. and above, $41.60 to $42.60; class A and gas pipe, $3 extra.

Old Material.—Consumptive buying has improved, although it cannot be said that a real buying movement is under way. A number of important local melters have made fair purchases of cast and malleable, however, and an iron mill has closed for about 1500 tons of No. 1 busheling. It is also evident that there have been substantial purchases of open-hearth grades. According to an unauthenticated report, the Gary works has placed orders for 10,000 tons, while it is also said that several thousand tons have been bought by another steel mill. On the whole, prices show greater firmness and a number of grades have advanced. That dealers anticipate a rising market is indicated by the fact that they are paying higher prices for railroad material than are quoted below.

We quote delivery in consumers' yards, Chicago and vicinity, all freight and transfer charges paid, as follows:

Per Gross Ton

Iron rails	$16.00 to	$16.50
Relaying rails	20.00 to	25.00
Cast iron car wheels	15.00 to	15.50
Rolled or forged steel car wheels	13.00 to	13.50
Steel rails, rerolling	12.00 to	12.50
Steel rails, less than 3 ft.	12.75 to	13.25
Heavy melting steel	11.50 to	12.00
Frogs, switches and guards cut apart	11.50 to	12.00
Shoveling steel	11.00 to	11.50
Low phos., heavy melting steel	13.50 to	14.00
Drop forge flashings	7.50 to	8.00
Hydraulic compressed sheet	8.00 to	8.50
Axle turnings	8.50 to	9.00

Per Net Ton

Iron angles and splice bars	14.00 to	14.50
Steel angle bars	10.75 to	11.25
Iron arch bars and transoms	15.00 to	15.50
Iron car axles	19.50 to	20.00
Steel car axles	12.50 to	13.00
No. 1 busheling	8.50 to	9.00
No. 2 busheling	6.00 to	6.50
Cut forge	10.00 to	10.50
Pipes and flues	6.50 to	7.00
No. 1 railroad wrought	10.50 to	11.00
No. 2 railroad wrought	10.00 to	10.50
Steel knuckles and couplers	11.00 to	11.50
Coil springs	12.50 to	13.00
No. 1 machinery cast	13.50 to	14.00
No. 1 railroad cast	13.00 to	13.50
Low phos. punchings	11.00 to	11.50
Locomotive tires, smooth	10.00 to	10.50
Machine shop turnings	4.50 to	5.00
Cast borings	6.25 to	6.75
Stove plate	12.50 to	13.00
Grate bars	10.50 to	11.00
Brake shoes	10.50 to	11.00
Railroad malleable	11.50 to	12.00
Agricultural malleable	11.50 to	12.00

Cincinnati

CINCINNATI, Feb. 21.

Pig Iron.—Some fair sized sales of pig iron were reported during the week, but in the majority of cases carload orders were the rule. There are evidences however, that the melt of iron is increasing slightly, and buyers are more receptive to advances by the sellers. The inquiry from some districts is still light and prices are inclined to be rather unsteady. Reports are current that Southern iron has been sold at $15, Birmingham base, and in this connection it is said that a Kentucky sanitary company has placed 1500 tons for prompt shipment at this figure. The general market, however, in the South remains quotable at $15.50, but a desirable tonnage no doubt could be placed at lower prices. Sales are about evenly divided between Northern and Southern. Of the former, a Portsmouth stove maker took 300 tons, and a Mansfield melter 100. An Indiana manufacturer bought 400 at a price said to be $18, Lake furnace. Several 100-ton sales of Northern furnaces also are reported. A Louisville melter bought 500 tons of Southern at $15.50 base, and an Indiana melter 100 tons at the same figure. A Cleveland district melter took 400 tons of silvery iron at the schedule. Outside the district a Michigan melter bought 5000 tons of foundry iron, and a St. Louis district foundry 200 tons of low phosphorus. Prices in the North are ruling about the same as last week, although a firmer tone is noted in Chicago and Cleveland iron.

Based on freight rates of $4.50 from Birmingham and $2.52 from Ironton, we quote f.o.b. Cincinnati:

Southern coke, sil. 1.75 to 2.25 (base)	$20.00 to	$20.50
Southern coke, sil. 2.25 to 2.75 (No. 2 soft)	20.50 to	21.00
Ohio silvery, 8 per cent sil.		30.02
Southern Ohio coke, sil. 1.75 to 2.25 (No. 2)	21.52 to	22.02
Basic, Northern		21.02
Malleable	22.02 to	22.52

Finished Material.—If one is to judge from reports, the aggregate tonnage placed during the week was perhaps the best for any similar period since Jan. 1. The orders, however, are still confined to carload lots, although occasionally up to 100 tons are desired. The largest inquiry reported is for 450 tons of bars for the L. & N. Railroad. There is no particular branch of the trade that is especially active and orders placed cover bars, shapes, plates and wire products. The sheet market has slowed up a little during the past two weeks, but several 100-ton orders were reported during the past week. Practically all orders placed are for immediate shipment and there is desire apparent on the part of buyers to contract for the future. Prices as a rule are holding at last week's levels, although it is said on wire fencing and wire nails, considerable shading is being done. Reports were current that one manufacturer of wire fencing was quoting 71 per cent off the list and that wire nails are available under the regular price of $2.40 per keg. On bars, shapes and plates, the usual quotation is 1.40c., and on sheets 3c. and 4c. for black and galvanized, respectively. Several weeks ago it was reported that galvanized sheets could be had at 3.75c., but this price apparently has disappeared, as all the orders now being placed are at the full schedule. There was little activity in the structural field during the week, the only award of consequence being 250 tons for the Capital Hotel at Frankfort to the Dayton Structural Steel Co., Dayton, Ohio. The American Car & Foundry Co. is taking bids on an addition to its plant at Huntington, W. Va., involving 500 tons. Frank L. Packard, Columbus, Ohio, will shortly call for bids on a twelve-story office building at Canton, Ohio, and a twelve-story bank building at Ironton, Ohio. The same firm will, early in April, send out plans for the North High School at Columbus, which will take a considerable tonnage of steel. Bids will close on Feb. 28 for the Wilde Bank Building at Indianapolis, involving 500 tons, on March 1 for the Indianapolis Athletic Club, involving 1200 tons, and on the same date for the Business Men's Club in Cincinnati, involving 500 tons. Pending projects include two school buildings at Middletown, Ohio, bids for which will close on Feb. 23, and a high school at Greenville, Ohio, which will come up during April. The new Hotel William at Columbus, Ohio, will not likely be up for bids before late spring, and plans are now being completed for the new hotel to replace the old Neil House in the same city. This building will be of sixteen stories and will also contain a theatre. The Big Four Railroad is inquiring for approximately 100,000 tie-plates and 3200 kegs of track bolts, bids for which will close on Feb. 27.

Old Material.—Local dealers report several tentative inquiries from steel companies, and also from jobbing foundries, but actual sales are few. It is expected, however, that some activity will be shown during the next week or two. Prices are soft, but unchanged.

We quote dealers' buying prices, f.o.b. cars:

Per Gross Ton	
Bundled sheets	$3.50 to $4.00
Iron rails	11.50 to 12.00
Relaying rails, 50 lb. and up	24.50 to 25.00
Rerolling steel rails	10.00 to 10.50
Heavy melting steel	8.50 to 9.00
Steel rails for melting	8.50 to 9.00
Car wheels	11.50 to 12.50
Per Net Ton	
No. 1 railroad wrought	8.00 to 8.50
Cast borings	3.00 to 3.50
Steel turnings	2.00 to 2.50
Railroad cast	11.50 to 12.00
No. 1 machinery	13.00 to 13.50
Burnt scrap	7.00 to 7.50
Iron axles	15.00 to 15.50
Locomotive tires (smooth inside)	9.00 to 9.50
Pipes and flues	3.50 to 4.00

Coke.—The coke market is showing considerable activity, the threatened coal strike being responsible in large part. Prices are stiffening somewhat, and Connellsville foundry coke is now quoted at $4 to $4.50, Wise County foundry at $5 to $5.50, and New River foundry at $7.50 to $8.

Warehouse Business.—Local jobbers report a fair week with particularly good orders for concrete reinforcing bars. While the tonnages are not heavy, the number of orders is increasing and on the whole conditions show some improvement. Some weakness has developed in the wire and nail market and it would not be surprising if lower prices were heard in the near future.

Iron and steel bars, 2.75c. base; hoops and bands, 2.85c. base; shapes and plates, 2.85c. base; reinforcing bars, 2.85½c. base; cold rolled rounds, 1½ in. and larger, 3.50c. base; under 1½ in. and flats, squares and hexagons, 4c.; No. 10 blue annealed sheets, 3.60c.; No. 28 black sheets, 4.25c.; No. 28 galvanized sheets, 5.25c.; wire nails, $2.95 per keg base; No. 9 annealed wire, $2.85 per 100 lb.

Proposed Merger for Japanese Iron Furnaces

"The proposal for a merger, which was recently started and at once dropped, is revived by Japanese furnaces, whose position, it is feared, becomes more helpless when the proposed naval holiday is effective," states the Japan *Advertiser* of Dec. 24. Views regarding the merger are again being exchanged among furnace managers, although it is thought that much time will elapse before the proposal materializes.

During the early months of 1921 the industry was confronted with its worst crisis, and at one time during the summer it was proposed by some ironmasters to render easier the position of the industry through the merger of all mills. This proposal was at once dropped because of some difficulties that were foreseen.

Buying, however, has been improving, which, coupled with the limited production at home and restricted importation from abroad, has served to lighten the burden of the market and industry. According to a stock report of Nov. 11, 1921, the total of the pig-iron stock in Japan was up to 255,990 tons. It is now believed to have fallen to approximately 250,000 tons.

Merger Proposal Revived

The proposal for a merger of the iron furnaces has again been revived, evidently because of the proposed naval holiday and its effect on the industry and also because of the uncertainty regarding the general revival of business. A short time ago representatives of several leading furnaces held a conference in the Industrial Club of Japan to discuss their present difficulty. As a result, the conclusion was reached that the only way open to them is to combine and readjust all Japanese furnaces.

It is stated in a report emanating from reliable quarters that managers of furnaces have begun the study of all problems pertaining to the maturing of their proposal, such as the warlike consumption of iron in Japan, the consumption of iron for commercial and industrial purposes, imports and exports, the cost of production at the different mills, etc.

Improved Situation in Spanish Iron Mines

Commercial Attaché Charles H. Cunningham, Madrid, says the situation in the mines of Bilbao is slightly improved, due to the increased demand for mineral ore in England. It is stated that orders have recently been received for about 115,000 tons of various classes of iron ore. This does not mean, however, a relief from the difficult situation which has prevailed in Bilbao during the past year, and where there are at present approximately 2,000,000 tons of red earth piled up without demand.

A voluntary petition in bankruptcy was filed Feb. 9 by the Racine Auto Tire Co., Racine, Wis. Schedules admit liabilities of $1,453,216 and claim assets of $1,642,836, which does not include the going or replacement value. Unsecured claims amount to $972,675, and secured claims $116,332. The largest secured creditor is the J. I. Case Threshing Machine Co., Racine, with a claim of $90,000, secured by a land contract. The largest items of the assets is machinery, which is listed as having a value of $402,185.

The referee in bankruptcy at Milwaukee has designed March 1 as the date when the entire assets of the defunct John Obenberger Forge Co. of West Allis, suburb of Milwaukee, are to be offered for sale at public auction. The sale will be held in room 502 of the Federal Building at Milwaukee, under the direction of J. F. Gerdis, trustee in bankruptcy.

Prices Finished Iron and Steel, f.o.b. Pittsburgh

Freight Rates

Freight rates from Pittsburgh on finished iron and steel products, in carload lots, to points named, per 100 lb., are as follows:

Philadelphia, domestic	$0.36	Kansas City	$0.815
Philadelphia, export	0.265	Kansas City (pipe)	0.77
Baltimore, domestic	0.35	St. Paul	0.665
Baltimore, export	0.255	Omaha	0.815
New York, domestic	0.38	Omaha (pipe)	0.77
New York, export	0.285	Denver	1.35
Boston, domestic	0.405	Denver (wire products)	1.415
Boston, export	0.285	Pacific Coast	1.665
Buffalo	0.295	Pacific Coast, ship plates	1.335
Cleveland	0.24	Birmingham	0.765
Detroit	0.325	Jacksonville, all rail	0.555
Cincinnati	0.325	Jacksonville, rail and water	0.46
Indianapolis	0.345	New Orleans	0.515
Chicago	0.38		
St. Louis	0.475		

The minimum carload to most of the foregoing points is 36,000 lb. To Denver the minimum loading is 40,000 lb., while to the Pacific Coast on all iron and steel products, except structural material, the minimum is 80,000 lb. On the latter item the rate applies to a minimum of 50,000 lb., and there is an extra charge of 9c. per 100 lb. on carloads of a minimum of 40,000 lb. On shipments of wrought iron and steel pipe to Kansas City, St. Paul, Omaha and Denver the minimum carload is 46,000 lb. On iron and steel items not noted above the rates vary somewhat and are given in detail in the regular railroad tariffs.

Rates from Atlantic Coast ports (i.e., New York, Philadelphia and Baltimore) to Pacific Coast ports of call on most steamship lines, via the Panama Canal, are as follows: Pig iron, 55c.; ship plates, 75c.; ingot and muck bars, structural steel, common wire products, including cut or wire nails, spikes and wire hoops, 75c.; sheets and tin plates, 60c. to 75c.; rods, wire rope, cable and strands, $1; wire fencing, netting and stretcher, 75c.; pipe, not over 8 in. in diameter, 75c.; over 8 in. in diameter, 2½c. per in. or fraction thereof additional. All prices per 100 lb. in carload lots, minimum 40,000 lb.

Structural Material

I-beams, 3 to 15 in.; channels, 3 to 15 in.; angles, 3 to 6 in., on one or both legs, ¼ in. thick and over, and zees, structural sizes, 1.40c. to 1.50c.

Sheared plates, ¼ in. and heavier, tank quality, 1.40c. to 1.50c.

Wire Products

Wire nails, $2.40 to $2.50 base per keg; galvanized, 1 in. and longer, including large-head barbed roofing nails, taking an advance over this price of $1.25 and shorter than 1 in., $1.75; bright Bessemer and basic wire, $2.15 to $2.25 per 100 lb.; annealed fence wire, Nos. 6 to 9, $2.15 to $2.25; galvanized wire, $2.65 to $2.75; galvanized barbed wire, $3.00 to $3.15; galvanized fence staples, $3.00 to $3.15; painted barbed wire, $2.55 to $2.65; polished fence staples, $2.55 to $2.65; cement-coated nails, per count keg, $1.90 to $2.00; these prices being subject to the usual advances for the smaller trade, all f.o.b. Pittsburgh, freight added to point of delivery, terms 60 days, net, less 2 per cent off for cash in 10 days. Discounts on woven-wire fencing are 70½ per cent off list for carload lots; 69½ per cent for 1000-rod lots, and 68½ per cent for small lots, f.o.b. Pittsburgh.

Bolts and Nuts

Machine bolts, small, rolled threads, 70, 10 and 10 per cent off list
Machine bolts, small, cut threads....70 and 10 per cent off list
Machine bolts, larger and longer....70 and 10 per cent off list
Carriage bolts, ⅜ in. x 6 in.:
Smaller and shorter rolled threads.70 and 10 per cent off list
Cut threads.....70 per cent off list
Longer and larger sizes.....70 per cent off list
Lag bolts.....70, 10 and 5 per cent off list
Plow bolts, Nos. 1, 2 and 3 heads....60 and 10 per cent off list
Other style heads.....20 per cent extra
Machine bolts, c.p.c. and t. nuts, ⅜ in. x 4 in.:
Smaller and shorter.....65, 10 and 5 per cent off list
Larger and longer sizes.....65 and 10 per cent off list
Hot pressed sq. or hex. blank nuts.....$5.50 off list
Hot pressed nuts, tapped.....$5.25 off list
C.p.c. and t. sq. or hex. blank nuts.....$5.25 off list
C.p.c. and t. sq. or hex. blank nuts, tapped.....$5.00 off list
Semi-finished hex. nuts:
¼ in. to 9/16 in. inclusive.....80, 10 and 10 per cent off list
Small sizes S. A. E.....80, 10, 10 and 10 per cent off list
⅝ in. to 1 in. inclusive, U. S. S. and S. A. E., 70, 10, 10 and 10 per cent off list
Stove bolts in packages....80 and 3 tens and 5 per cent off list
Stove bolts in bulk.....80, 3 tens and 2½ per cent off list
Tire bolts.....70, 10 and 5 per cent off list
Track bolts, carloads.....3c. to 3.25c. base
Track bolts, less than carloads.....4c. to 4.25c.

Upset and Hex. Head Cap Screws

½ in. and under.....80 and 10 to 80, 10 and 10 per cent off list
9/16 in. to ¾ in.....80 and 10 to 80, 10 and 10 per cent off list

Upset Set Screws

½ in. and under.....80, 10 and 5 to 85 per cent off list
9/16 in. to ¾ in.....80, 10 and 5 to 85 per cent off list

Milled Square and Hex. Cap Screws

All sizes.....75 and 10 to 80 per cent off list

Milled Set Screws

All sizes.....70, 10 and 10 per cent off list

Rivets

Large structural and ship rivets.....$2.10
Large boiler rivets.....2.20
Small rivets.....75 and 10 off list

Wire Rods

No. 5 common basic or Bessemer rods to domestic consumers, $35 to $36; chain rods, $35 to $36; screw stock rods, $40 to $41; rivet and bolt rods and other rods of that character, $35 to $36; high carbon rods, $42 to $46, depending on carbons.

Railroad Spikes and Track Bolts

Railroad spikes, 9/16-in. and larger, $2.15 to $2.20 base per 100 lb. in lots of 200 kegs of 200 lb. each or more; spikes, ½-in., ⅝-in. and 7/16-in., $2.25 to $2.30 base; 5/16-in., $2.25 to $2.30 base. Boat and barge spikes, $2.25 to $2.30 base per 100 lb. in carload lots of 200 kegs or more, f.o.b. Pittsburgh. Track bolts, 3c. to 3.25c. base per 100 lb. Tie plates, $2 per 100 lb. Angle bars, $2.40 per 100 lb.

Terne Plates

Prices of terne plates are as follows: 8-lb. coating, 200 lb., $9.30 per package; 8-lb. coating, I. C., $9.60; 15-lb. coating, I. C., $11.80; 20-lb. coating, I. C., $13; 25-lb. coating, I. C., $14.25; 30-lb. coating, I. C., $15.25; 35-lb. coating, I. C., $16.25; 40-lb. coating, I. C., $17.25 per package, all f.o.b. Pittsburgh, freight added to point of delivery.

Iron and Steel Bars

Steel bars, 1.40c. from mill. Refined bar iron, 2c. to 2.10c.

Welded Pipe

The following discounts are to jobbers for carload lots on the Pittsburgh basing card:

Butt Weld

Steel, Inches	Black	Galv.	Iron, Inches	Black	Galv.
⅛	54½	28	¼ to ⅜	+ 3½	+22½
¼ to ⅜	60	33½	½	36½	18½
½	65	50½	¾	42½	27½
¾	69	56½	1 to 1½	44½	29½
1 to 3	71	58½			

Lap Weld

2	64	51½	2	39½	25½
2½ to 6	68	55½	2½ to 6	42½	29½
7 to 8	65	51½	7 to 12	40½	27½
9 to 12	64	50½			

Butt Weld, extra strong, plain ends

⅛	50½	33	¼ to ⅜	+ 4½	+37½
¼ to ⅜	56	38½	½	35½	23½
½	62	50½	¾	42½	28½
¾	67	55½	1 to 1½	44½	30½
1 to 1½	69	57½			
2 to 3	70	58½			

Lap Weld, extra strong, plain ends

2	62	50½	2	40½	27½
2½ to 4	66	54½	2½ to 4	43½	31½
4½ to 6	65	53½	4½ to 6	42½	30½
7 to 8	61	47½	7 to 8	35½	23½
9 to 12	55	41½	9 to 12	30½	18½

To the large jobbing trade the above discounts are increased by one point, with supplementary discounts of 5 and 2½ per cent.

Boiler Tubes

The following are the discounts for carload lots f.o.b. Pittsburgh:

Lap Welded Steel		*Charcoal Iron*	
1¾ in.	26½	1½ in.	5
2 to 2¼ in.	41	1¾ to 1⅞ in.	15
2½ to 3 in.	53	2 to 2¼ in.	25
3¼ to 13 in.	57	2½ to 3 in.	30
		3¼ to 4½ in.	32

To large buyers of steel tubes, a supplementary discount of 5 per cent is allowed.

Standard Commercial Seamless Boiler Tubes

New discounts have been adopted on standard commercial seamless boiler tubes, but manufacturers are not yet ready to announce them for publication, and for that reason we publish no discounts this week.

Sheets

Prices for mill shipments on sheets of standard gage in carloads, f.o.b. Pittsburgh, follow:

Blue Annealed

Cents per Lb.		Cents per Lb.	
No. 8 and heavier	2.20	Nos. 11 and 12	2.30
Nos. 9 and 10 (base)	2.25	Nos. 13 and 14	2.35
		Nos. 15 and 16	2.45

Box Annealed, One Pass Cold Rolled

Cents per Lb.		Cents per Lb.	
Nos. 17 to 21	2.80	No. 28 (base)	3.00
Nos. 22 to 24	2.85	No. 29	3.10
Nos. 25 and 26	2.90	No. 30	3.20
No. 27	2.95		

Galvanized

Cents per Lb.		Cents per Lb.	
Nos. 10 and 11	3.00	Nos. 25 and 26	3.70
Nos. 12 to 14	3.10	No. 27	3.85
Nos. 15 and 16	3.25	No. 28 (base)	4.00
Nos. 17 to 21	3.40	No. 29	4.25
Nos. 22 to 24	3.55	No. 30	4.50

Tin-Mill Black Plate

Cents per Lb.		Cents per Lb.	
Nos. 15 and 16	2.80	No. 28 (base)	3.00
Nos. 17 to 21	2.85	No. 29	3.05
Nos. 22 to 24	2.90	No. 30	3.05
Nos. 25 to 27	2.95	Nos. 30½ and 31	3.10

PERSONAL

Huntington Downer, who for the past two years has been district sales manager in Philadelphia for the Lackawanna Steel Co., Buffalo, has resigned that position to become manager of the iron and steel department of the Iron Trade Products Co., Pittsburgh. Mr. Downer has had a thorough training in the steel business. After his graduation from Yale University, he entered the operating department of the Lackawanna Steel Co., learning the business from the mining of ore to the production of semi-finished and finished steel. He then entered sales work and was in the general sales department of the company at the time of his appointment to the position in Philadelphia. The Iron Trade Products Co., with which Mr. Downer becomes identified, is engaged on a brokerage basis in the sale of ore, pig iron, alloys, fluorspar and other materials used in the iron and steel trade.

HUNTINGTON DOWNER

Lewis D. McClaren, for a number of years on the sales force of Rogers, Brown & Co., pig iron brokers at Chicago, has resigned to become sales manager of the coke department of the Wisconsin Lime & Cement Co., Conway Building, Chicago. This company has the Chicago agency for the sale of Roberts by-product coke, manufactured by the St. Louis Coke & Chemical Co., Granite City, Ill. C. E. Trommer, sales representative Rogers, Brown & Co., at St. Louis, has been transferred to Chicago to take the place made vacant by Mr. McClaren.

Lester G. Sigourney has recently been chosen secretary of the New Departure Mfg. Co., Bristol, Conn., manufacturer of ball bearings, etc. He has been with the company for several years.

John D. Ryan, chairman of the board of directors of the Anaconda Copper Co., Cornelius F. Kelley, president of the same company, and Benj. B. Thayer, vice-president of the company, were all elected directors of the American Brass Co., Waterbury, Conn., at the recent meeting of the latter company. They were also chosen on the executive committee of the American Brass Co.

Hollinshead N. Taylor, president N. & G. Taylor Co., manufacturer of tin plate, Philadelphia, who was elected a member of the board of directors of the Philadelphia Chamber of Commerce to succeed James B. Bonner of the Carnegie Steel Co. on the latter's removal to Washington, has been appointed a member of the executive committee of that organization. He is also chairman of the industrial committee and a member of the committees on public utilities and aviation.

C. W. Forcier, 433 Union Arcade Building, has been appointed Pittsburgh district sales representative the Tacony Steel Co., Philadelphia.

Lorenz Maisel has disposed of his interest in the Madison, Wis., Tool & Stamping Works, and retires as treasurer and general manager. Mr. Maisel in November, 1920, resigned as general superintendent Burgess Battery Co., Madison, to take an important interest in the tool works, which he reorganized. He has not made public plans for the future.

C. L. Dewey, who was associated with Carl Akeley in the invention and development of the cement-gun, and who has done extensive cement-gun contract work under the names of the Dewey Cement-Gun Co. and the Traylor-Dewey Contracting Co., Allentown, Pa., has joined the forces of the Cement-Gun Construction Co., Chicago. He will devote his time exclusively to the development of cement-gun contract work.

Justus Egbert, director of purchases, American Radiator Co., Buffalo, has resigned, effective March 1, and will be succeeded by L. H. Beyer. In conjunction with Ralph Waldo of Rogers, Brown & Co., and W. J. McClain, Buffalo sales representative of Republic Iron & Steel Co., Mr. Egbert is forming a company to be known as Waldo, Egbert & McClain, Inc., with headquarters at Buffalo, to sell pig iron, coke, steel, various alloys, fire brick, molding sand, etc.

Ritchie Gill, of the International Sales Corporation, Victoria Street, London, S. W., has taken up his quarters at the Gotham Hotel, New York, and is desirous of getting in touch with substantial houses handling ironmongery in the United Kingdom and Europe.

Elliot D. Drury, formerly sales representative Greenfield Tap & Die Corporation, Greenfield, Mass., is now assistant sales manager American Wringer Co., Woonsocket, R. I.

J. T. Brierly, formerly general manager and treasurer Brierly-Lombard Co., Worcester, Mass., mill supplies, was elected president of the Thompson-Copeland Co., that city, lock washers, nuts, etc., at the annual stockholders' meeting last week. E. A. Copeland is vice-president, and Harry C. Thompson treasurer.

Charles C. Boyden, who resigned his position with the Alan Wood Iron & Steel Co., Philadelphia, a few months ago and went on a trip to California, has returned. His present address is Foxbury, Mass.

Paul L. Battey, formerly vice-president of the Arnold Co., Chicago, and for years chief engineer in charge of various industrial enterprises, including the large Willys-Overland establishment at Elizabeth, N. J., has established himself at 123 West Madison Street, Chicago, as consulting engineer for industrial plants.

Decision Favors U. S. Steel Products Co.

WASHINGTON, Feb. 21.—In a tentative opinion handed down to-day, Attorney Examiner Charles F. Gerry recommends that the Interstate Commerce Commission direct the Director General and the railroads involved to waive the collection of demurrage and storage charges assessed against the United States Steel Products Co. on shipments of iron and steel products delivered at Seattle and Tacoma, Wash., for export to the Philippine Islands, Japan and other Far Eastern destinations during the period from July 1, 1918, to Sept. 9, 1919.

It is held in the tentative report that the charges were legally applicable to the shipments, but that the defendants failed, in conformity with tariff provisions, to notify anyone that the shipments had arrived at Seattle or Tacoma or that they were ready to make delivery at such ports of exit and that therefore the charges were illegal. Charges for the detention of the shipments in excess of free time at those ports remain unpaid and delivering carriers have brought actions at law which are pending.

The Steel Products company took the case to the commission and by the tentative report has been upheld in its claims that the charges have been assessed without tariff authority and if found legally applicable are unjust and in violation of the Federal Control Act. Because of this, the Steel Products company has sought waiver of payment.

Steel Corporation Stock Subscriptions

It was announced at the office of the United States Steel Corporation, Monday, that the stock subscriptions to date this year were by 34,432 employees who subscribed 94,258 shares. Last year up to March 1, 81,710 employees subscribed for 255,325 shares, while in 1920, 66,407 employees subscribed for 167,407 shares. The periods of depression and prosperity have thus been reflected in subscriptions.

OBITUARY

JOSEPH E. SCHWAB, brother of Charles M. Schwab, chairman of the Bethlehem Steel Corporation, and himself prominent for many years in the steel industry, died last Friday afternoon at the Hotel Collingwood, New York, where he had made his home for some time past. The cause of death was given as diabetes, from which he had been suffering for nearly a year. Joseph E. Schwab was born at Loretto, Pa., on Feb. 23, 1864. He joined the engineering department of the Carnegie Steel Co. in 1883, two years after Charles M. Schwab became associated with that company. He continued his service in the engineering department until 1894, when he was made manager of the company's Duquesne Works and he remained there until the formation of the United States Steel Corporation, when he came to New York as assistant to Charles M. Schwab, who had become president of the corporation. Two years later Joseph E. Schwab was made president of the American Steel Foundries, but after a few years he retired from all business activities. He leaves a wife and two children, the elder a son, Charles M. Schwab, who was born on his uncle's birthday and named for him, and a daughter, Dorothy; also two brothers and two sisters, Charles M. and Edward H. Schwab, Mrs. David Barry of Johnstown, Pa., and Sister M. Cecilia of Seton Hill College, Greensburg, Pa. The funeral services were held privately at Loretto, Pa., on Monday.

WILLIAM C. SARGENT, for 22 years secretary and also a director of Chain Belt Co., Milwaukee, died suddenly on Feb. 5 as a result of heart failure. He was 73 years of age and had been in ill health for several years. Mr. Sargent, prominent in industrial circles of Milwaukee and St. Paul, had a wide national acquaintanceship. He was born at Troy, N. Y., Feb. 2, 1849. In 1871 he moved West, locating at St. Paul, where he organized the De Cou, Corliss & Sargent Co., manufacturer of sash and doors. He later became affiliated with the St. Paul Harvester Co. and met C. W. Le Valley, who later founded the Chain Belt Co. of Milwaukee. This meeting was the beginning of a long business association, for in 1900 Mr. Sargent went to Milwaukee to become secretary and later a director of the Chain Belt Co. He was also a director of the Federal Malleable Co., West Allis, Wis. His father was one of the founders of the Terre Haute, Alton & St. Louis Railroad.

JAMES M. ATCHESON, 73 years old, agent for the H. C. Frick Coke Co., with offices in the Carnegie Building, Pittsburgh, died Feb. 14, in St. Petersburg, Fla., where he was spending the winter. Mr. Atcheson had been in failing health for almost a year. He was born in Allegheny, Pa., and had been in the employ of the H. C. Frick Coke Co. more than 30 years.

LOUIS FRANCIS PHIPPS, chairman of the board of directors of the American Frog & Switch Co., Hamilton, Ohio, died suddenly at his home in Cincinnati on Feb. 14. Mr. Phipps was 70 years old and had been identified with the Hamilton company for the past 15 years. Before that time he was connected with the old Globe Rolling Mill. He is survived by a widow and six sisters.

WILLIAM R. KINNEAR, founder of the Kinnear Mfg. Co., Columbus, Ohio, died at his home in Indianapolis on Feb. 12, aged 75. Mr. Kinnear established the Kinnear Mfg. Co. 25 years ago, but sold out his interests 15 years ago and since that time has resided in New York and Indianapolis.

SIR GEORGE J. CARTER, managing director of the Birkenhead Works of Cammell, Laird & Co., Ltd., Sheffield and Birkenhead, England, died Feb. 11 at the age of 62.

R. K. DANA, manager York Insulated Wire Works of General Electric Co., New York, died Wednesday, Feb. 1.

Railroad Rate Hearings to Be Concluded This Week

WASHINGTON, Feb. 21.—Hearings in connection with the general rate investigation before the Interstate Commerce Commission will be concluded on Saturday of the present week. They have been under way for almost six weeks and shippers in every line have appeared before the commission and urged substantial reductions in rates as a means looking to the restoration of normal economic conditions. The iron and steel interests were vigorous in their expression of such an attitude. But from the first the railroads have combatted proposed general reductions, claiming that it would result in so depleting their revenues that they would be bankrupted. The contention of shippers has been that the increased traffic arising from lower rates would more than offset the present high rates and bring about larger net returns for the railroads.

It obviously is a question as to what the decision of the commission will be. It is evident, however, that the prevailing opinion of those who have followed the hearings is that the commission, if it makes any reductions, will content itself with lowering rates on raw products, and perhaps order certain readjustments in some lines. They do not think a general reduction is likely in the near future, but will be left to work itself out gradually. For one thing, it is believed by some that coal will be among the products whose rates will be cut. In this connection, significance is attached to the fact that discussion about coal freight rates engaged the attention of the cabinet meeting last Friday. It also is recalled that Secretary of Commerce Hoover urged reductions on raw products including several manufactured lines, among them metals and metal products, but opposed a general reduction in rates and urged an investigation as to the possibility of increasing some class rates.

Southern Iron Now Competitive in Chicago Territory

CHICAGO, Feb. 18.—The recent advance of local pig iron to $20 base, Chicago, puts the delivered prices on that product above Southern iron at numerous points in Chicago territory. The comparative figures appended below, which were recently sent out in a circular letter to the trade by the local office of the Matthew Addy Co., are figured on a Birmingham base of $15.50. The difference in favor of the South would be even greater if the base were placed at $15 at which price, or its equivalent, some iron has been sold in that territory recently. Those Southern producers which are able to take advantage of combination river and rail rates are in even a better position to compete in the Chicago district. The Matthew Addy figures are as follows:

	Chicago	Birmingham
Battle Creek, Mich.	$23.36	$22.56
Benton Harbor, Mich.	22.94	22.17
Crown Point, Ind.	22.10	21.90
Dowagiac, Mich.	22.94	22.44
Grand Haven, Mich.	23.36	22.84
Grand Rapids, Mich.	23.36	22.84
Hastings, Mich.	23.36	22.84
Holland, Mich.	23.36	22.84
Kendallville, Ind.	22.94	22.17
Lansing, Mich.	23.50	22.56
LaPorte, Ind.	21.96	22.17
Manistee, Mich.	25.60	24.03
Mishawaka, Ind.	22.94	22.17
Muskegon, Mich.	23.36	22.84
Owosso, Mich.	23.50	23.10
South Bend, Ind.	22.10	22.17

Complaint of Furnace Co. Discussed

BUFFALO, Feb. 21.—Federal Judge John R. Hazel of United States Court has dismissed the complaint of the Buffalo Union Furnace Co. in its suit against the United States Shipping Board to collect payments for the undelivered portion of a tonnage of 1200 tons of pig iron contracted for in 1918. The Shipping Board canceled the contract after the signing of the armistice. Judge Hazel ruled the Board has the right to so cancel. Other actions growing out of similar cancellations have been held pending this decision.

NON-FERROUS METALS

The Week's Prices

Cents Per Pound for Early Delivery

	Copper, New York		Straits Tin	Lead		Zinc	
Feb.	Lake	Electrolytic*	New York	New York	St. Louis	New York	St. Louis
15.....	13.25	13.00	30.37½	4.70	4.40	4.85	4.50
16.....	13.12½	12.87½	30.50	4.70	4.40	4.85	4.50
17.....	13.12½	12.87½	30.25	4.70	4.40	4.85	4.50
18.....	13.00	12.75	....	4.70	4.40	4.85	4.50
20.....	13.00	12.75	29.62½	4.70	4.40	4.85	4.50

*Refinery quotation.

New York

NEW YORK, Feb. 20.

Some of the markets are more active than others, but demand in general is not heavy. The copper market continues to decline on light demand and offerings from dealers. The tin market has been active, but prices have declined. Good business has been done in lead and prices are firm. There has been no improvement in the zinc market except that prices have remained stationary.

Copper.—Consumers are no more interested in purchases of copper now than they have been for the last few weeks, and as a result the market has again declined because of the light demand and because of offerings from dealers and small producers. Electrolytic copper is quoted from 13c. to 13.25c. delivered, or 12.75c. to 13c., refinery, at which levels some business has been done. Most of the large producers will not meet these prices but are comfortably booked, at least for the first quarter. The opinion prevails that the market cannot go much lower because it has probably reached a level at which dealers bought their stocks, but this view may not prove to be true. The Lake copper market is quotably lower in sympathy with the electrolytic.

Tin.—The feature of this market has been the sharp break in the London market to-day because of the liquidation on a fairly extended scale of a large Dutch syndicate. It is stated that Banca tin has been offered for shipment from England and Holland at an equivalent of 29c., delivered, New York. As a result of this the spot Straits market to-day is lower at 29.62½c., New York, and the London market is £7 to £8 per ton lower than a week ago, at £144 for spot standard, £146 for future standard and £146 15s. for spot Straits, with sales of 1200 tons of standard tin. Previous to to-day's developments, on Feb. 15, 16 and 17, there were fairly good sales in this market of Straits tin to consumers. On the first of those days about 400 to 500 tons, mostly future shipment, changed hands and on the other two days about 300 tons was sold, mostly to consumers, although dealers were fair purchasers on the last day. Arrivals thus far this month have been 2260 tons, with 7825 tons reported afloat.

Lead.—Very good business is reported to have been done in the last week and several thousand tons were sold to consumers, probably for March delivery, various consuming interests being the buyers. Prices have not changed and the leading interest continues to quote 4.70c., New York and St. Louis, while independents are selling at 4.40c., St. Louis, or 4.70c. to 4.75c., New York and Eastern points.

Zinc.—Fundamental conditions are unchanged and the market is neither active nor weak. Consumers still buy small lots for early dellvery to cover immediate light needs and prime Western for February-March delivery is unchanged at 4.50c., St. Louis, or 4.85c., New York, with the market regarded as firm by some sellers and slightly weak by others. Sales below these levels are, however, not heard of and it is significant that this price has been shaded but once in the last four weeks.

Antimony.—The market continues quiet with wholesale lots for early delivery quoted at 4.40c., New York, duty paid.

Aluminum.—The leading interest continues to quote virgin metal, 98 to 99 per cent pure, in wholesale lots for early delivery at 19c. to 19.10c., f.o.b. plant, depending on the quantity, with the same grade offered by importers at 17c. to 18c., New York, duty paid.

Chicago

FEB. 20.—All of the metals are exceedingly quiet and weak, further reductions being recorded in copper and tin. We quote in carload lots: Lake copper, 13.25c.; tin, 31c.; lead, 4.50c.; spelter, 4.55c. to 4.60c.; antimony, 6.50c., in less than carload lots. On old metals we quote: Copper wire, crucible shapes and copper clips, 9.50c.; copper bottoms, 7.50c.; red brass, 7.50c.; yellow brass, 6c.; lead pipe, 3.25c.; zinc, 2c.; pewter, No. 1, 22c.; tin foil, 23c.; block tin, 25c.; all buying prices for less than carload lots.

Low Output of Canadian Iron in December

The production of pig iron in Canada during last December declined to the lowest level for the year, according to a recent issue of the *Monetary Times*. The total pig iron made amounted to only 39,917 long tons, all of which was made in blast furnaces. By kinds of iron produced the December output was: Basic, 30,698 tons; foundry, 2,948 tons; and malleable, 6,271 tons. Ferroalloys to the amount of 846 tons were produced. On Dec. 31 there were only two furnaces in blast, although the Dominion had at least five furnaces active throughout the greater part of the year. The average monthly output of pig iron during the 12 months ending December was 50,000 tons, or less than the average monthly record for any year since 1908. Throughout the entire period, during which a total of 595,000 long tons of pig iron were made, the market was decidedly quiet and the suspension of interest in iron was general.

Production of Steel Ingots and Castings

The output of steel ingots and castings for the months of November and December were, respectively, 75,039 tons and 42,653 tons. Of the December output 41,100 tons consisted of basic open-hearth steel ingots, made by the producers for their own further use in manufacturing. A total of 1,551 tons of direct steel castings was made, of which 1,458 tons were produced for direct sale, comprising 657 tons of basic open-hearth castings, 97 tons Bessemer castings, and 704 tons of steel castings from electric furnaces.

The production of steel ingots and castings during the 12 months ending December, 1921, was 667,484 long tons, as compared with 1,109,000 tons made during 1920. Of the total 1921 production, 645,075 tons were in the form of direct steel ingots, comprising 641,882 tons of basic open-hearth steel, 239 tons acid open-hearth steel, 94 tons Bessemer, and 2,860 tons made in electric furnaces.

At the Detroit meeting of the National Safety Congress during the week of Aug. 28 to Sept. 21 the sessions will be held entirely within the new Cass Technical High School, wherein are self-contained foundries, chemical laboratories, steel heating plants, machine shops and complete power machinery equipment, which will provide facilities for all of the sectional meetings.

The Bureau of Supplies and Accounts, Navy Department, Washington, is taking bids until Feb. 21 for 100,700 lb. of steel plates and I-beams for use at the local navy yard.

The Purchasing Agent, office of the Board of Commissioners, District of Columbia, Washington, is taking bids until March 2 for 17,000 ft. of wire cable for the electrical department.

FERROMANGANESE SUPPLIES

1921 Output Lowest in Ten Years—Available Supplies—Small Production of Spiegeleisen

The sharp decline in pig iron production in 1921 has been paralleled by that of ferromanganese and spiegeleisen. According to the monthly blast furnace returns of THE IRON AGE, the production of ferromanganese last year was the lowest in 10 years. Still more striking was the fall in the output of spiegeleisen, which reached figures lower than any recorded in many years.

From an average in the first quarter of the year of 19,178 gross tons per month, the ferromanganese production declined to only 3758 tons per month in the fourth quarter. The total for the year was only 98,439 tons or 8203 tons per month or about the same as the production in the 5 years 1910 to 1914 of 8280 tons per month. In 1911 the total was 74,482 tons or 6207 tons per month. In 1918 the output was 345,306 tons or 28,775 tons per month, the high average.

Of spiegeleisen only 56,139 tons was made in 1921 which compares with 65,391 tons in 1919. In 1918 the production was 249,002 tons or nearly four times as much.

The following table gives the output of ferromanganese and spielegeisen for 1921, compared with previous records:

Ferromanganese and Spiegeleisen Output in the United States in Gross Tons

	Ferromanganese	Spiegeleisen	Total	Aver. Per Month
First quar., 1921, av. per mo.	19,178	11,667	30,845	.....
Second quar., 1921, av. per mo.	5,814	5,314	11,128	.....
Third quar., 1921, av. per mo.	2,892	1,338	4,229	.....
October, 1921	3,902	....	....	.....
November, 1921	3,525	....	....	.....
December, 1921	3,847	....	....	.....
Fourth quar., 1921, av. per mo.	3,758	.....	3,758	.....
Total, 1921	98,439	56,139	154,578	12,881
Total, 1920	282,681	103,448	386,129	32,177
Total, 1919	179,029	65,391	244,470	20,732
Total, 1918	345,306	249,002	594,308	49,525
Total, 1913	119,495	126,081	245,576	20,464
January, 1922	5,644	1,230	6,874	.....

For the first time since last July, spiegeleisen was produced in January, this year, and the output of ferromanganese advanced almost 2000 tons over the rate at the end of the year.

Available Supplies

The available supplies of ferromanganese for 1921 and previous years, as obtained from an analysis of the output, imports and exports were as follows:

Ferromanganese Output, Imports and Exports, and Available Supplies, in Gross Tons

Average per month	Output	Imports	Exports	Available Supply
1921	8,203	755	57	8,901
1920	23,557	4,941	288	28,210
1919	14,923	2,752	255	17,420
1918	28,775	2,264	298	30,741
1917	21,486	3,703	*776	25,413
1916	17,365	7,577	...	.....
1915	12,021	4,605	...	.....
1913	9,958	10,672	...	.....
1911	6,207	6,688	...	12,895
5-yr. aver. (1910-14) per month	8,280	8,399	...	.....

*First half only.

Available supplies fell in 1921 to only 8901 tons per month or to the lowest figure in many years. This was intensified by the low rate of imports of only 755 tons per month, a figure probably never reached before. Exports have never been a factor of magnitude but they were only one-fifth in 1921 of what they were in 1920.

Manganese Ore Imports

Manganese ore imports last year, while not the lowest in recent years, were down to 33,446 tons per month as compared with 27,779 tons per month in 1919, the lowest since 1913. In the last quarter of last year these imports had fallen to 20,093 tons per month. Imports for the last quarter of 1921 and for the last few years are given in the following table:

Manganese Ore Imports in Gross Tons

	Total	Average Per Month
October, 1921	36,760	.....
November, 1921	8,620	.....
December, 1921	14,900	.....
Fourth quarter, 1921	60,280	20,093
Total, 1921	401,354	33,446
Total, 1920	606,937	50,578
Total, 1919	332,344	27,779
Total, 1918	491,303	40,942
Total, 1917	629,972	52,498
Total, 1916	576,324	48,027
Total, 1915	320,784	26,732
Total, 1913	345,084	28,858

British Supplies and Manganese Ore

The decline in the imports into Great Britain of manganese ore was much more severe last year than in the case of the American imports. The following table shows these imports for various periods and years:

British Imports of Manganese Ore

	Total	Average Per Month
First half, 1921	142,038	23,673
Third quarter, 1921	14,559	4,853
October, 1921	3,164	.....
November, 1921	6,174	.....
December, 1921	6,921	.....
Fourth quarter, 1921	16,259	5,419
Total, 1921	172,856	14,405
Total, 1920	452,613	37,718
Total, 1919	265,800	22,150
Total, 1918	365,606	30,467
Total, 1917	331,264	27,605
Total, 1916	439,509	36,625
Total, 1915	377,324	31,443
Total, 1914	479,435	39,953
Total, 1913	601,177	50,098

These data show that the imports have gradually declined, almost each year since 1913, until for 1921 they are only 14,405 tons per month or about one third of the 1913 receipts. At the end of last year, they had fallen to only 5419 tons per month or about one quarter of the American imports for the same period.

Supplies and Needs in 1921

In the last review of this nature in THE IRON AGE, Nov. 17, 1921, it was estimated that theoretically 147,000 tons of ferromanaganese would be needed, if the steel ingot and castings output totalled 21,000,000 tons. Later estimates placed the steel output at 20,000,000 tons, which would require 140,000 tons of ferromanganese. To meet this theoretical need there was 98,439 tons produced and 9059 tons imported which with the exports at 684 tons would leave available 106,814 tons. At the end of last year therefore, there was an apparent deficiency of about 33,000 tons, but heavy supplies carried over from 1920 probably amply cover this apparent deficiency.

More Shipments by River

WHEELING, Feb. 20.—Use of the inland waterways in the shipment of steel products as a means of offsetting the advantage of freight which Middle Western mills now have on business in the South and Southwest, is extending. The Wheeling Steel Products Co., the sales subsidiary of the Wheeling Steel Corporation, last week made a shipment of 1600 tons of steel pipe from the tube works at Benwood, W. Va. This is understood to be the first step toward the establishment of a regular river transportation service by the company. It has been found that water shipments take little, if any, more time than rail freight deliveries and the cost is considerably less.

The Bario Metals Corporation, New York, will commence at once the installation of a new alloy melting department including the installation of four electric melting furnaces. The contract for the complete melting department has been awarded to F. J. Ryan & Co., industrial furnace engineers, Wesley Building, Philadelphia.

BOOK REVIEWS

Hardware Buying Directory. Pages 722, 7 x 10½ in. Published by Hardware Age, 239 West Thirty-ninth Street, New York.

Hardware Buyers Directory is a substantially bound reference book which is designed to acquaint the wholesale and retail hardware dealers with the names, addresses and trade names of manufacturers of products in the hardware and allied lines. The January issue contains about 2500 headings of products under which are listed approximately 35,000 names, addresses and trade names.

Many manufacturers show illustrated and descriptive data of their products, which in connection with the listings enhance the value of the directory as a reference book. Distribution is made quarterly to 40,000 wholesale and retail hardware dealers in the United States, Canada and to foreign countries where English is the commercial language.

Mineral Land Surveying.—By James Underhill, mining engineer, U. S. Mineral Surveyor for Colorado. Pages 237, 5½ by 7¾. Published by John Wiley & Sons, Inc., New York.

This is the third edition, and several additions have been made, especially in the treatment of the direct solar observation. The specimen field notes, to illustrate the requirements of the office of the United States Surveyor General for Colorado, have been entirely rewritten, a different group of claims being used, and they represent the practice at the present time in the survey of mineral lines in the Western portion of the United States.

Mechanical World Year Book for 1922. Reference book; thirty-fifth year of publication. Published by Emmott & Co., Ltd., 65 King Street, Manchester, England. Size, 4 x 6 in., with 348 pages of text, 267 pages to a buyers' directory and 54 pages for diary and memoranda. Price, 2s. 6d.

Conventional engineers reference book, giving considerable space to power plant equipment, including steam, oil and gas engines, boilers, condensers, turbines and other apparatus. Several pages are devoted to the properties of metals and alloys and also to structural iron and steel work. A comparatively large section is given to toothed gearing and several pages to grinding, screw cutting, indexing on the universal milling machine, limit gages and allied subjects. Space is also devoted to ball and roller bearings, friction and lubrication, hydraulic work, and the heating and evaporating of liquids. A section on pipes and tubes contains a concise collection of data on pipes of cast iron, wrought iron, steel and copper, with many tables of dimensions and details of tees, bends, etc.

The volume includes many useful mathematical and other tables. The subject classifications in the buyers' directory are given in English, French, Spanish and Russian.

The Ship Compendium and Year Book 1922, published by Compendiums, Ltd., 18 Old Compton Street, London, W. 1, England, is a volume of 1008 pages claimed to be the first international reference book on ship construction, equipment, ownership and maintenance. It supplies in 800 sections the names and addresses of 30,000 firms whose interests are germane to ships and shipping. Book is published at £2 9s. 6d., post free for foreign delivery.

New Books Received

Mineral Resources of the United States, 1918. Part I., Metals, G. F. Loughlin, geologist in charge; Part II., Nonmetals, R. W. Stone, geologist in charge. Pages vol. I., 1096; vol. II., 1557, 9 x 5¾ in. Published by Government Printing Office, Washington.

Burning Liquid Fuel. By William Newton Best. Pages 341, 9 x 6 in.; illustrations 316. Published by U. P. C. Book Co., 243 West Thirty-ninth Street, New York. Price $5.

NEW TRADE PUBLICATIONS

Oil Burners.—Denver Fire Clay Co., Denver, Col. A 32-page booklet covering the advantages and operation of oil burners; composition and heating value of various brands of oils, their viscosity, specific gravity and other information, accompanied by tables and charts. The process of oil combustion in the burner is explained and illustrated with drawings. Sectional drawings show oil burners applied to various types of boilers and forges. There is also an illustrated page of refractories manufactured by this company.

Grinding Machines.—Cincinnati Grinder Co., Cincinnati. Booklet illustrating automotive parts grinding machine and power feed and hand feed machines, together with type of work. Illustrations of sections and parts are accompanied by brief descriptions.

Steel Tanks.—Ferguson-Allan Co., 504 Bailey Avenue, Buffalo. Bulletin No. 101, dealing with oil and gasoline storage tanks. Line drawings and tables of dimensions, weights and capacities of tanks are included and drawings of compartment truck and wagon tanks and steel dump bodies.

Stokers.—Under-Feed Stoker Co. of America, Book Building, Detroit. Bulletin describing the Jones standard side-dump stoker, a new type. Construction, capacity, automatic air and fuel control and mechanical features are covered with numerous illustrations.

Crawl Tread Crane.—Industrial Works, Bay City, Mich. Catalog No. 113 illustrating type BC crawling tractor crane of 20,000 lb. capacity, designed for road contractors, lumber and coal dealers, foundries and railroad reclamation and storage yards.

Milling on Locomotive Repairs.—Cincinnati Milling Machine Co., Cincinnati. Booklet of 32 pages, compiled to prove to railroad shops the economy of milling their parts. Line drawings show many of the parts which may be milled and there is a listing of 49 parts which come into a railroad repair shop that should be milled.

Industrial Plant Construction.—W. W. Lindsay & Co., Inc., Harrison Building, Philadelphia. Booklet containing views of industrial plants built by the company.

Machine Tools.—Triplex Machine Tool Corporation, 18 East Forty-first Street, New York. Catalog No. 1 describes this company's bench machine, adaptable to turning and boring, angular and vertical milling, thread cutting and drilling.

Waterproofing.—Truscon Laboratories, Detroit. A 32-page booklet dealing with the "Science and Practice of Integral Waterproofing." Specifications are given for waterproofing mass concrete, general masonry by using the cement plaster coat method and waterproofing cement stucco. A section covers the application of the cement plaster coat.

Testing.—Dorr Co., engineer, 101 Park Avenue, New York. Illustrated booklet describing company's plant at Westport, Conn., and methods in handling a test or analysis and the scope of this work are explained.

Fire Alarms.—United States Automatic Fire Alarm Co., Kansas City, Mo. A 32-page booklet of automatic fire alarms illustrating circuit panels, transmitters, circuit breakers, thermostats, punch registers, generators, etc.

The monthly stock list of Joseph T. Ryerson & Son, Sixteenth and Rockwell streets, Chicago, has been enlarged from 64 to 128 pages with the January-February issue and will hereafter bear the title "Ryerson Journal and Stock List." Besides the usual stock list the machine tools handled by the company are illustrated and there are several brief articles and news notes.

The Wetmore Reamer Co., 62-66 Twenty-seventh Street, Milwaukee, recently consolidated with the Wisconsin Tool & Supply Co., 210 Second Street, has increased its working schedules and force and is now operating at approximately 95 per cent of capacity on orders for reamers, gages, tools, dies and fixtures. New business is developing on a broader scale, especially in the East and in automotive centers, according to E. J. Waltzer, president and general manager.

A reduction of 10 per cent in wages for all employees has been approved by the employees of the Commonwealth Steel Co., Granite City, Ill. The Commonwealth company has been paying more than the union scale. Under the reduction molders will receive 90c. an hour as against the union scale of 75c. an hour, and laborers 35c. an hour, as against the union scale of 30c.

First Sectional Meeting of the American Society for Steel Treating

The first sectional meeting of the American Society for Steel Treating will be held at the Hotel McAlpin, New York, on Friday, March 3. The program is as follows:

11:00 a.m. to
1:30 p.m.—Registration.
1:30 p.m.—Address of welcome.
2:00 p.m. to
4:30 p.m.—Technical session. Chairman, George L. Norris, chairman New York Chapter; vice-chairman, Irving H. Cowdrey, chairman Boston Chapter.

"Cold Headed Bolts—Their Metallography and Heat Treatment" (illustrated), by V. E. Hillman, metallurgist Crompton & Knowles Loom Works, Worcester, Mass.

"New Developments on the Influence of Mass in Heat Treatment," by E. J. Janitzky, metallurgist Illinois Steel Co., South Chicago.

"The Magnetic Testing of Small Case Hardened Chain" (An actual demonstration of the process and results of the testing will be given by the author), by A. V. DeForest, metallurgist American Chain Co., Bridgeport, Conn.

"Stainless Steel in Cutlery Use" (illustrated), by R. G. Hall, research engineer R. Wallace & Sons Mfg. Co., Wallingford, Conn.

"Calite—A New Heat-Resisting Alloy" (illustrated), by G. R. Brophy, metallurgist research laboratory General Electric Co., Schenectady, N. Y.

6:00 p.m. to
7:30 p.m.—Informal dinner, Yates' Restaurant, Forty-third Street, near Broadway.
8:00 p.m. to
10:00 p.m.—Technical session. Chairman, A. W. F. Green, chairman Philadelphia Chapter. Presentation of certificate of honorary membership to Dr. John A. Mathews.

"Perfecting a Drop Forging" (illustrated), by J. H. G. Williams, assistant works manager Billings & Spencer Co., Hartford, Conn.

"The Manufacture of Steel" (illustrated), by B. H. DeLong, metallurgist Carpenter Steel Co., Reading, Pa.

Nearly all of the technical papers in this program have been published in the February *Transactions* of the society and both members and non-members are urgently requested to participate in the discussions. This sectional meeting will serve the membership of 14 of the Eastern and New England chapters of the society and any one, interested in the art of steel treating but not members of the society, is cordially invited to attend.

The second sectional meeting will be held at Pittsburgh in the Bureau of Mines auditorium, May 25 and 26.

The annual exposition and convention of the national organization will be held in the General Motors Building, Detroit, Oct. 2 to 7 instead of in September as originally planned.

Meeting of Electric Steel Founders' Research Group

Officers and operating representatives of the Electric Steel Founders' Research Group held their last regular meeting in Milwaukee on Feb. 6, 7 and 8. This group was formed about two years ago for the systematic prosecution of co-operative technical work which could be directly applied in improving the manufacture of steel castings.

The idea back of this co-operation originated from the realization that the technical experts who are usually found directing the operating departments of steel foundries are prevented by routine work from concentrating on the investigations. These could be prosecuted more effectively if they would engage the exclusive attention of one individual and if he would co-ordinate the technical activities of a few plants whose processes and products place the companies in the same class.

The members of the group are the Electric Steel Co., Chicago; the Ft. Pitt Steel Casting Co., McKeesport, Pa.; the Lebanon Steel Foundry, Lebanon, Pa.; the Michigan Steel Casting Co., Detroit, and the Sivyer Steel Casting Co., Milwaukee. The group's headquarters are at 639 Diversey Parkway, Chicago, where Major R. A. Bull, research director of the organization, maintains his office.

At the Milwaukee meeting reports were made by the operating heads of plants on comprehensive investigations into important foundry problems that had been delegated by the group to the several companies. It is stated that much progress is being made through these group investigations and that prospects for future accomplishments are most encouraging. The group researches which were reported in detail at the Milwaukee meeting included those on the subjects of annealing, core practice, facing sands, furnace practice and pouring practice.

An inspection was made by all members of the group of the processes employed at the plant of the Sivyer Steel Casting Co.

Roberts Coke Oven Discussed

The Roberts coke oven was the subject of a paper presented at Pittsburgh before the Eastern States Blast Furnace and Coke Oven Association at the William Penn Hotel on the evening of Feb. 16, by M. W. Ditto, consulting engineer of the American Coke & Chemical Co., Chicago. Mr. Ditto covered construction features and also the experience with the use of the coke in the blast furnace of the National Enameling & Stamping Co. at Granite City, Ill. The coke plant comprises 80 Roberts recuperative by-product coke ovens in two batteries built by the St. Louis Coke & Chemical Co., a subsidiary of the American company.

About ninety members and guests were present. A dinner preceded the technical session and seated with President West of the association and with Mr. Ditto was C. A. Meissner, as guest of honor, of the United States Steel Corporation.

The twenty-fifth annual convention of the American Mining Congress will be held in Cleveland, Oct. 9 to 14. The National Exposition of Mines and Mining Equipment, which attracted attention at the annual meeting in Chicago last fall, will again be a feature of this industrial gathering. The exposition will be staged in the Public Hall in Cleveland—a modern convention building recently completed by the city.

COMING MEETINGS

February

American Association of Engineers. Feb. 22. Congress Hotel, Chicago. Secretary, C. E. Drayer, 63 West Adams Street, Chicago.

March

American Society for Steel Treating. March 3. Sectional meeting, Hotel McAlpin, New York. Secretary, W. H. Eisenman, 4600 Prospect Avenue, Cleveland.

Refractories Manufacturers' Association. March 15, 16 and 17. Annual meeting, Chicago. Secretary, F. W. Donahoe.

April

National Metal Trades Association. April 19 and 20. Annual meeting, Hotel Astor, New York. Secretary, Louis W. Fischer, Peoples Gas Building, Chicago.

American Supply and Machinery Manufacturers' Association and Southern Supply & Machinery Dealers' Association. Joint Meeting. April 24 to 26, Birmingham. F. D. Mitchell, 233 Broadway, New York, is secretary of the American association and A. M. Smith, Smith-Courtney Co., Richmond, Va., is secretary of the Southern association.

Society of Industrial Engineers. April 26 to 28. Spring meeting, Hotel Statler, Detroit. George C. Dent, business manager, 327 S. La Salle Street, Chicago.

American Electrochemical Society. April 27 to 29. Spring meeting, Baltimore. Acting secretary, Dr. Colin G. Fink, 110 Park Avenue, New York.

Trade Changes

Cote Bros. Mfg. Corporation, maker of the "Simplicity" refillable fuse with general offices at 1425 First National Bank Building, Chicago has established branch offices during the past month in New York, Philadelphia, Boston, San Francisco, Cleveland, Tampa and Denver.

The Eclipse Stove Co., Mansfield, Ohio, has changed its name to the Tappen Stove Co. The new name was adopted owing to the fact that members of the Tappen family have been permanently identified with the Eclipse Stove Co. during the 40 years that it has been in existence.

The Casey-Hudson Co., Chicago, will remove its business to Chelsea, Mich., occupying the No. 8 plant, power plant and foundry of the Lewis Spring & Axle Co. This property will be purchased from F. H. Lewis.

George W. Cravens, formerly of Westfield, N. J., has been elected president of the Climax Engineering Co., Clinton, Iowa, a subsidiary of the Dulany Trust. G. W. Dulany, Jr., has been president of the Dulany Trust since its organization in 1915 and also chairman of the board of trustees of the trust. The business of the Climax Engineering Co. has grown so as to require the presence of a president who could give more time than Mr. Dulany could give, hence the election of Mr. Cravens. Mr. Dulany was re-elected president of the board of trustees, C. B. Stebbins was re-elected vice-president, Mr. R. D. Upton, re-elected trasurer, and Mr. J. M. Thompson was re-elected secretary. Mr. Cravens, the new president, was for many years with the General Electric Co.

Oliver Machinery Co., Grand Rapids, Mich., has established a new branch office at 716 Lincoln Bank Building, Minneapolis. George C. Ramer, who has had extended experience in the sales department, will be in charge.

McMullen Machinery Co., 64-66 Ionia Avenue, Grand Rapids, Mich., has been appointed exclusive representative by the Diamant Tool & Mfg. Co., Inc., 91-97 Runyon Street, Newark, N. J., in connection with the sale of Diamant standard punch and die sets, in the territory covered by all of the northern peninsula of Michigan and the southern peninsula of Michigan west of the counties of Bay, Saginaw, Shiawassee, Ingham, Jackson and Hillsdale.

The Wyckoff Drawn Steel Co., Frick Building, Pittsburgh, announces the appointment of the recently organized Craine-Schrage Steel Co., with general offices and warehouse at 6189 Greenwood Avenue, Detroit, as its exclusive sales representative and distributor in the Michigan territory.

The Andrews rust proofing process used extensively during the war by the British Government is now available to manufacturers for forming an ebony, rust-proofed finish on ferrous metals. It is claimed that this rust proofing process has stood the Government "salt-spray" test with 100 per cent success. The Surface Combustion Co., Inc., industrial furnace engineer and manufacturer, 366-368 Gerard Avenue, Bronx, New York, has secured the exclusive license for exploiting this process in this country and foreign countries.

The Hesse-Martin Iron Works and the Ersted Machinery Mfg. Co., Portland, Ore., have been consolidated under the name of the Hesse-Ersted Iron Works Co., with $150,000 capital stock. The merged company will operate at the Hesse-Martin plant, 468 East Taylor Street, which will be enlarged and improved. The incorporators of the new company are Fred Hesse, A. J. Ersted and A. M. Mears.

The Reeves Pulley Co., Columbus, Ind, has appointed the Dodge Sales Engineering Co., Mishawaka, Ind., general sales agent for the "Reeves" variable speed transmission at the Dodge branches in Pittsburgh, Cincinnati, Atlanta, Minneapolis and Chicago.

Effective March 1, the name of the Medart Patent Pulley Co., St. Louis, will be changed to the Medart Co.

The Commercial Shearing & Stamping Co., Youngstown, Ohio, has moved its general offices to new quarters in connection with its plant in the Logan Avenue district, Youngstown.

The Argo Iron & Metal Co., Chicago, has moved its scrap iron and metal yards to 1640-52 Elston Avenue, where it is located on a siding of the Chicago & Northwestern Railroad.

The Chicago office of the Matthew Addy Co., pig iron brokers, will be moved from the McCormick Building to 1901 People's Gas Building, effective May 1.

The Max Ams Machine Co., New York, regrets to [illegible] that it will not open the Rochester office at this time [illegible] stated in a previous announcement.

Plans of New Companies

The Efficient Electrical Display Co., Inc., 26 Court [illegible], Brooklyn, is in the market for factory equipment to increase its output to 100 good sized signs per month. In about five or six weeks, it will be in the market for [illegible] two-piece sign receptacles and also 20,000 ft. of No. 14 [illegible] covered wire. The only contract awarded thus far has been for the alterations of a building purchased for the manufacture of signs.

Sundh Engineering & Machine Co., Philadelphia, manufacturer of finishing machinery for brass, copper and steel strip mills, has closed its branch office at Eleventh Avenue and Twenty-sixth Street, New York and opened a Philadelphia downtown office in the Otis Bldg., Sixteenth and Sansom Streets.

East Chicago Mfg. Co., East Chicago, Ind., expects to do some of its work by contract and some in its own plant. It is not yet ready to name the material which it will manufacture.

The Detroit Marine-Aero Engine Co., 4196 Bellevue Avenue, Detroit, has completed the construction of a steel and corrugated iron building containing 12,500 square feet.

The Beaver Enameling Co., Ellwood City, Pa., has taken over the business of the Crichton Curl Enameling Co. It does not intend to build and is not in the market for equipment.

The Hackney Iron & Steel Co., Enid, Okla., is putting in a stock of reinforcing bars, structural steel and is doing some fabricating. It also has a foundry which is in operation.

G. B. Wickersham, secretary-treasurer of the Muncie Steel Supply Co., has organized G. B. Wickersham & Co., Keenan Building, Pittsburgh, to handle scrap and conduct a general business as auctioneers, appraisers and liquidators. The firm expects to open a yard equipped for economical handling of scrap. Mr. Wickersham retains his interest in the position with the Muncie Steel Supply Co.

Bayonne Steel Products Co. is located at 216-218 Jelliff Avenue, Newark, N. J. This is only temporary quarters, as the company intends to build a fine warehouse in Newark the coming spring or early summer.

L. T. Petersen, former vice-president and general manager of the Republic Rubber Corp., Youngstown, Ohio, is engaged in the organization of a company to manufacture a new type of conveyor belting. The belting has been patented by Mr. Petersen and is claimed to be especially adaptable for use in conveying ore, limestone, coke, metal, grain and other heavy materials.

Schraeder, Gocher & Co. Organized

O. A. R. Schraeder, formerly a partner with J. W. Sanders Co., New York, and Donald Gocher, formerly with sales department of Certain-teed Products Corporation's Philadelphia office, have formed a sales organization as Schraeder, Gocher & Co., 1218 Chestnut Street, Philadelphia, which has assumed the management of the sales department of the Bridesburg Foundry & Engineering Co., Inc., Frankford, Philadelphia, founder of brass, bronze and aluminum castings, both rough and machined.

This company is also selling the product of Atlas Foundry Co., Irvington, N. J., cast-iron welding rods and miscellaneous iron castings. In conjunction with the J. W. Sanders Co., New York, also manufacturers' representative, this company is covering the Philadelphia territory for the Crosby Co., Buffalo, sheet metal stampings; Elliott-Blair Steel Co., New Castle, Pa., manufacturer of fine cold-rolled strip steel, and the Lakeside Forge Co., Erie, Pa., on miscellaneous drop forgings and wrenches.

The Amalgamated Metals Selling Co., Ltd., 42 Broadway, New York, has been appointed sole representative in the United States of the Erftwerke A. G., Grevenbroich, Cologne, Germany. This company is known as the largest and most important producer of virgin aluminum in Germany.

The Interstate Commerce Commission opened a hearing on an application for revised rates on scrap iron and steel at Washington on Feb. 20. The contention is that scrap rates are too high, especially when pig iron rates are used as a standard for comparison.

IRON AND INDUSTRIAL STOCKS

Better Demand for Steel and Equipment Issues During the Past Week

Under the leadership of such issues as United States Steel common and the locomotive shares, there was a better demand and generally higher prices for steel and equipment securities. The buying possibly is based on the greater activity in buying of railroad equipment and in steel mills. Investors in a great many instances, however, are satisfied that developments dealing with the bonus question, and the accompanying higher prices for war bonds. The recovery in sterling exchange is another constructive feature that has encouraged renewed buying of domestic industrial securities. Higher prices quoted for pipe securities reflect better buying of that product.

The range of prices on active iron and industrial stocks from Monday of last week to Monday of this week was as follows:

Am. Chal. com..	44 - 45½	Int. Har. pf....	105½-106½
Am. Chal. pf....	92 - 93	Lack. Steel	46½- 48⅞
Am. Can com...	37¼- 40⅛	Midvale Steel...	29¾- 30¾
Am. Can pf.....	96¾- 99	Nat.-Acme	10⅞- 11
Am. C. & F. com.	145½-149	Nat. E. & S. com.	40⅝- 43¾
Am. C. & F. pf..	119½- ..	N. Y. Air Brake	59 - 59⅝
Am. Loco. com..	106¼-110⅜	Nova Scotia Steel	24¾- 25
Am. Loco. pf....	114¼- ..	Press. Steel com.	63½- 65¾
Am. Rad. com...	83¼- 89⅝	Press. Steel pf..	91 - 92
Am. Stl. F. com..	32 - 32½	Ry. S. Spg. com.	95½- 98
Am. Stl. F. pf...	93 - ..	Ry. S. Spg. pf..	113½-114⅛
Bald. Loco. com.	102¾-106	Replogle Steel...	30⅛- 31¾
Bald. Loco. pf...	106 -107¼	Republic com....	51¾- 53½
Beth. Steel com.	58⅛- 60	Republic pf.	82 - 84
Beth. Steel, Cl. B	62⅝- 65⅝	Sloss com.....	39⅝- 41
Beth. Stl. 8% pf.	106⅞-107½	Un. Alloy Steel..	26¾- 27
Chic. Pneu. Tool.	65½- 67	U. S. Pipe com..	24¼- 26⅝
Colorado Fuel...	26½- 27	U. S. Pipe pf...	60 - 63½
Crucible Steel com.	60⅜- 62⅞	U. S. Steel com.	88⅛- 91⅜
Crucible Steel pf...	81 - 82	U. S. Steel pf...	116¼-116⅝
Gen. Electric....	146 -151	Vanadium Steel..	34 - 35⅝
Gt. No. Ore Cert.	34⅞- 35⅝	Va. I. C. & C...	50 - 83
Gulf States Steel	72½- 76¾	West'house Elec..	52⅞- 55
Int. Har. com...	84½- 85½		

Annual Financial Statements

The report of the Thomas Iron Co., Hokendauqua, Pa., for 1921 shows a net loss for the year of $69,536.50, this including the operation of its subsidiary, the Ironton Railroad Co. At the close of last year the inventories of pig iron and iron ore were marked down $89,714.18 to present-day values. The company's total production of iron in 1921 was only 15,169 tons.

Earnings of the Pressed Steel Car Co. for 1921 were much lower than in the previous year. Last year's surplus totalled $681,906, compared with a surplus of $2,531,305 at the close of business in 1920. The 1921 earnings provide for $5.45 a share on $12,500,000 preferred stock, as compared with a 1920 surplus which not only took care of the preferred stock dividend but left $13.25 a share for the common stock.

The Baldwin Locomotive Works earned net profits in 1921 amounting to $5,044,096, equivalent, after payment of preferred dividends, to $18.22 a share on the $20,000,000 common stock, as compared with net profits of $4,428,518, or $15.14 a share on the same amount of common stock in 1920.

Earnings of the Allis-Chalmers Mfg. Co. for 1921 show a net profit of $2,215,467, equal to $4.11 a share on the common stock after deducting preferred dividends. The 1920 net profits were $3,564,248, or $9.35 a share on the common stock.

The annual report of the American Can Co. for the year ended Dec. 31, 1921, shows net earnings of $7,020,261, as compared with $9,851,876 in the previous year. The surplus after preferred dividends of $1,141,530 compares with $1,944,587 in 1920.

The Continental Can Co., Inc., for 1921, reports a surplus after depreciation and federal taxes of $811,004, equivalent after preferred dividends to $3.75 a share on the outstanding $12,500,000 common stock. In 1920 the company showed a surplus of $1,548,620, or $9.19 a share.

A special stockholders' meeting of the Walworth Mfg. Co., Boston, wrenches, fittings, etc., has been called for Feb. 27 to act on a proposed $7,500,000 bond issue. The purpose of the proposed issue is to raise funds to retire outstanding bonded indebtedness and to provide additional working capital.

Stockholders of the Saco-Lowell Shops, Boston, textile machinery, have ratified the proposed increase of $1,762,500 in the common stock for the purpose of paying a 50 per cent stock dividend to common shareholders.

The Truscon Steel Co. last year, after charges, depreciation and dividends, showed a loss of $336,000. The company wrote off $980,000 on its inventory and plant depreciation. At the annual meeting President Kahn stated that business in January and so far in February was 30 per cent ahead of that for the corresponding period last year.

The Truscon Steel Co., Youngstown, Ohio, has declared the regular quarterly preferred dividend of $1.75 per share, payable March 1 to stockholders of record Feb. 18.

The Composite Metal Lath Co., Hobart, Ind., has been declared bankrupt. The liabilities of the company are listed at $117,219, while the assets are placed at $46,448.

The Fred Medart Mfg. Co. has increased its capital stock from $150,000 to $750,000, of which 58 3/10 per cent is paid. The company has assets of $1,053,936.21 and liabilities of $380,962.41.

Study of Income Tax Returns

Washington, Feb. 21.—Statistical study of the economic data compiled from the returns of the net income of individuals, corporations and partnerships, for the calendar year ended Dec. 31, 1919, by the office of the Commission of Internal Revenue, reported to the Secretary of Treasury, was made public yesterday and reveals the large portion of total taxes paid by manufacturers of metal and metal products, including iron and steel makers and allied lines.

The figures also reveal, through deficits reported, the general slump in business for that year. The number of corporation income tax returns for 1919, other than those of personal service corporations, was 320,198, of which 209,634 reported net incomes amounting to $9,411,418,458; income tax, $743,535,888; war profits and excess profits taxes, $1,431,805,690, making the total taxes $2,175,341,578. For the calendar year 1918, the number was 317,579 of which 202,061 reported net income of $8,361,511,249, and taxes aggregating $3,158,764,422.

The number of individuals who filed income tax returns for 1919 amounted to 5,332,760. The total amount of net revenue reported by these returns was $19,859,491,448, and the normal tax and surtax amounted to $1,269,630,104. As compared with 1919, these figures show a growth of 907,646, in the number of returns filed, and an increase in the total net income reported amounting to $3,934,852,093. Likewise, an increase of $141,908,269 is noted in the total tax.

The total number of producers of metal and metal products reporting in 1919 was 13,118, of which 9,689, or 73.86 per cent, reported net incomes amounting to $1,789,212,574. The gross income was $12,616,661,680, and the total deductions aggregated $10,827,449,106. The total number of corporations reporting was 67,852, of which 51,903, or 76.49 per cent, reported net income amounting to $5,219,334,985. The gross income of all the manufacturing interests was $45,704,873,968, with total deductions aggregating $40,485,528,983.

It will be seen that the net income of producers of metal and metal products for the year was 30 per cent of the total for all manufacturers. The income tax paid by makers of metal and metal products was $142,561,320, and the war profits and excess profits taxes $314,690,473, making a total tax of $457,251,793, which constituted 21.02 per cent of the distribution of the total taxes paid by all industrial groups, or 25.55 per cent of the total tax compared with the net income. The income tax paid by all manufacturing interests was $414,891,763, and the war profits and excess profits tax aggregated $944,306,603, making a total tax of $1,359,198,366, or 62.48 per cent of the distribution of the total taxes paid by all industrial groups, or 26.04 per cent of the total tax as compared with the net income.

There were 3,429 producers of metal and metal products who reported deficits in 1919. This represented 26.14 per cent of the total number of producers of metal and metal products. The deficit reported aggregated $119,834,070. The gross income of these manufacturers was $897,478,703, while total deductions were $1,017,312,773. The total number of manufacturers reporting deficits was 15,949, or 23.51 per

cent of all manufacturers. The aggregate deficit was $266,745,733. Their gross income was $6,548,702,815, while their total deductions amounted to $6,951,448,548.

Showing the distribution of corporation income by industrial groups and by nature of deductions, the study of the Commissioner reports that including both those reporting net income and those reporting no net income, the total gross income of the 13,118 producers of metal and metal products was $13,514,140,383. This cost of goods was $9,044,525,883. The compensation of officers was $203,724,391, the interest paid being $122,444,338, while the domestic tax was $126,560,917; exhaustion, amortization and depletion, $334,825,764; miscellaneous expenses, $2,012,677,586; total deductions, $11,844,761,879; net income before deducting $1,669,378,504, while the net income after deducting the taxes was $1,212,126,711. The cost of goods or producers of metal and metal products was 66.93 per cent of the total gross income; the compensation of officers 1.51 per cent; interest paid 0.91 per cent; domestic tax, 0.94 per cent; exhaustion, amortization and depletion 2.48; miscellaneous expenses 14.88; total deductions 87.65; net income before deducting taxes 12.35; income tax, war profits and excess profits taxes, 4.38, and net income after deducting taxes 8.97.

The table shows that the net income of manufacturers of metal and metal products was 17.65 per cent of the invested capital of those paying taxes, while the total taxes was 25.55 per cent of the net income.

The 373 metal mining interests making returns in 1919 reported an invested capital of $443,920,533, with a net income of $72,192,392, on which an income tax of $6,469,539 was paid, while the war profits and excess profit taxes amounted to $2,690,155, making a total tax of $9,159,694. Their total tax was 16.26 per cent of the invested capital and 12.69 per cent of the total net income.

UNEMPLOYMENT

Study Suggested by President's Conference—Kenyon Bills Have Rough Skidding

WASHINGTON, Feb. 21.—Study of the fundamentals of unemployment, and especially the methods for controlling the business cycle, was begun yesterday at a meeting at the Department of Commerce. A tentative plan drawn by Dr. Wesley C. Mitchell, of the National Bureau of Economic Research, was presented and a discussion of the subject was made. The meeting was addressed by Secretary of Commerce Hoover. Owen D. Young is chairman of the committee which has charge of the study. The meeting was inaugurated under the President's recent conference on unemployment, and its purpose is to illuminate the subject of cyclical unemployment.

Secretary Hoover is of the opinion that more information is necessary before the problem is solved, and indicated that until a more thorough understanding of the question is obtained, legislation on the subject is not timely. Because of this, the Administration is not disappointed at the failure of the Senate to pass the bill prepared and introduced by Senator Kenyon of Iowa to press public works during times of depression and to retard them during periods of industrial activity. After a two-day discussion, the bill was referred by the Senate last Thursday to the Committee on Education and Labor. This is considered to be equivalent to killing the measure for this season, at least.

Senators attacked the bill on the ground that it would give too much power to executive officials of the Government who would be empowered by the measure to control employment on public works by the method suggested.

Senator Sterling, of South Dakota, declared the bill was paternalistic in spirit and was supported by "big business." Senator Kenyon asserted that he had presented the bill chiefly in the interest of labor and that it had the endorsement of the American Federation of Labor, the Chamber of Commerce of the United States, and other organizations, and contended that it was a concrete result of the conference on unemployment and embodied principles recommended. In this connection, however, members of the conference feel that more information on the subject is necessary.

Senator Kenyon's bill to control the coal mining industry, details of which were explained in THE IRON AGE of Feb. 2, was also introduced last week and appears to have little support either in Congress or in Administration circles. Its passage at the present session, at least, does not appear at all likely. It had been hoped by Senator Kenyon, who has resigned from the Senate, effective Feb. 24, to become a judge of the United States Circuit Court, that the bill could be passed in time to set up the proposed coal mining board, so that the latter would be functioning, in an effort to prevent the threatened coal strike set for April 1.

To Prevent Jurisdictional Strikes

WASHINGTON, Feb. 21.—The Associated General Contractors of America, the American Institute of Architects, the Engineering Council, the National Building Trades Employers' Association, and the Building Trades Department of the American Federation of Labor through the National Board for Jurisdictional Awards which has just concluded its regular quarterly meeting in Washington, have reached a national agreement through a resolution heavily penalizing union workmen who refuse to abide by the decisions of the board.

The resolution provides that local building trades councils of union labor shall suspend unions and refuse to recognize or support those unions which refuse to abide by decisions of the National Board; it also provides that general contractors and sub-contractors who employ only union labor shall incorporate in their agreements with labor a provision that will secure compliance with all the decisions of the board and that they shall refuse employment to members of local unions which do not abide by such decisions and further that architects and engineers shall insert in all their specifications and contracts a clause that such decisions shall be followed.

This resolution is of far reaching consequence to settle those jurisdictional disputes, which have caused many strikes, with resulting delays and economic losses.

Flurry in Coal and Coke Markets

UNIONTOWN, PA., Feb. 20.—A flurry in both the coal and coke markets has been evident in the Connellsville region this week. This is attributable, in a measure, to the threatened strike in the union fields on April 1. Most observers, however, believe they see in the present situation an improvement which will be sustained and improved from month to month.

Several deals for furnace coke were closed this week for March requirements at $3.25. A number of coal sales covering March requirements also have been made during the week. The Pittsburgh and Lake Erie Railroad has bought considerable coal during the week.

Frick Coke Co. operations in both coal and coke were strengthened this week.

Harry I. Worman, superintendent of motive power of the St. Louis & San Francisco Railroad, Springfield, Mo., has announced that the shops there will be leased to contractors and operated on a piece-work basis if the car workers reject the proposal to return to the piece-work basis.

A. E. Crockett, manager of the Bureau of Instruction of Jones & Laughlin Steel Co., Pittsburgh, gave an illustrated lecture on the manufacture of steel before the members of the Rotary Club of St. Louis on Feb. 16.

Machinery Markets and News of the Works

LULL IN INQUIRIES AND SALES

Market Spotty and Orders for Most Part Are for Single Tools

Otis Elevator Co. Issues List for Nine Machines and a Textile Interest a List for Ten

A lull in inquiry and sales is reported quite generally. In view of the hopes aroused by events of December and January, business so far this month has been disappointing. Orders are for the most part for single tools and competition is keen on each inquiry that appears. There is a fair degree of interest shown in used tools and in this connection it is reported from Cincinnati that used machines are coming into the market freely and at extremely low prices. A Massachusetts textile interest came into the market during the week with a list of 10 tools and miscellaneous equipment.

The Otis Elevator Co. has issued a list calling for four lathes of 14, 18 and 24-in. size; two drilling machines; two double-end grinders, and one cold cut-off saw.

Except for a revival of an old list of the Sewell Valley Railroad involving a 36-in. planer, a 250-ton wheel press, a 1200-ton steam drop hammer and a universal milling machine, no railroad inquiries have appeared nor has any action been taken on pending lists.

During the week the Hammond, Ind., Board of Education awarded the list of tools reported last week to a local dealer in Chicago. The Kelly Valve Co., Muskegon, Mich., placed an order in the Chicago district for four No. 2 turret lathes and miscellaneous equipment. Part of the list recently issued by the H. B. Smith Co., Westfield, Mass., and involving a fairly heavy equipment, has been placed with a Worcester machine-tool builder.

Machine-tool builders in other districts are taking a hopeful view of the future. Although still far from active, machine shops in New England are showing more signs of life. Makers of road machinery are beginning to secure substantial orders and in the Pittsburgh district makers of steel mill equipment note better inquiry. In this connection it is reported that expenditures of a considerable sum for new equipment in one of the Pittsburgh district units of the Steel Corporation is under consideration. In Chicago the trade is encouraged by the opening of the new tractor works of the International Harvester Co. and the Milwaukee plant of that company is expected to resume in the near future.

The price situation remains substantially the same, the only change noted being a reduction averaging 15 per cent on hack saws by the Racine Tool & Machine Co. and a 25 per cent cut on turret lathes by the Warner & Swasey Co.

New York

NEW YORK, Feb. 21.

This month has been a great disappointment to those who expected that improvement in business, which was promised by events of December and January, has not materialized. Sales in this market for February will probably fall below those of the two preceding months. A large machine-tool company which keeps a chart of its sales reports that the curve was upward beginning in November and continuing to the end of January, but that the line will probably take a dip downward for February unless considerably more business should develop before the end of the month.

A fair degree of interest in used tools is shown by some buyers, but orders for new tools are at very low ebb and prospects are not numerous.

From the viewpoint of sales the crane market is dull, but there is an increasing number of inquiries pending. Few new inquiries are reported in the market this week. Russell, Burdsall & Ward, Portchester, N. Y., are receiving quotations on a 2-ton transfer crane. The Wallingford Steel Co., Wallingford, Conn., reported to have purchased 10-ton and 3-ton overhead traveling cranes last week, placed this order with the Niles-Bement-Pond Co. The U. G. I. Contracting Co., Philadelphia, has purchased a 40-ton power house crane for Syracuse, N. Y., from the Niles-Bement-Pond Co. The L. B. Foster Co., Pittsburgh, Pa., has purchased a 20-ton, 50-ft. boom, used, Browning locomotive crane from Philip T. King, 26 Church Street, New York. The Milwaukee Electric Railroad & Light Co., Milwaukee, Wis., has purchased a 12½-ton, 15-ft. and 30-ft. boom locomotive crane from the Industrial Works. The electric tramrail division of the Cleveland Crane & Engineering Co. recently sold a 2-ton, 1200-ft. tramrail and 24 trolleys to the Hydro-United Tire Co., Pottstown, Pa., four 1-ton electric hoists for this installation being furnished by the Shepard Electric Crane & Hoist Co.

The Yonkers Electric Light & Power Co., 9 Manor Square, Yonkers, N. Y., has completed plans and will soon commence the erection of a new one-story power house on Columbus Avenue, estimated to cost about $250,000, including equipment. Thomas E. Murray, 55 Duane Street, New York, is engineer.

The Columbia Ice Corporation, New York, care of Ophuls, Hill & McCreery, 112 West Forty-second Street, engineers, has completed plans for a two-story, reinforced-concrete ice manufacturing plant at Whitlock and Bryant avenues, estimated to cost about $235,000, including machinery.

Seven electrically operated centrifugal pumps, electric motors and other equipment will be installed at the new pumping plant and filter station at the municipal waterworks, Newburgh, N. Y. Bids for the construction and equipment are being received up to March 20 by the city manager, W. Johnston McKay. George W. Fuller and James C. Harding, 170 Broadway, New York, are engineers.

The New York Edison Co., 130 East Fifteenth Street, New York, has completed plans for the erection of a new two-story power house at 33 Attorney Street, 25 x 100 ft., estimated to cost about $75,000. William Whitehill, Sixth Avenue and Forty-first Street, is architect.

The George Haiss Mfg. Co., Canal Place, New York, manufacturer of coal-handling machinery, wagon loaders, etc., has filed plans for a new one-story building, 75 x 95 ft. It will be owned by the Haiss Realty Co., a subsidiary organization.

A vocational department will be installed in the new high school to be erected at Hornell, N. Y., estimated to cost about $350,000, and for which bids will be asked early in March. Tooker & Marsh, 101 Park Avenue, New York, are architects.

The Witherbee Storage Battery Co., 643 West Forty-third Street, New York, will discontinue operations at its local plant, as well as at North Bergen, N. Y., and will concentrate production in its new works at Belleville, N. J., totaling about 30,000 sq. ft. of floor space. Machinery from the present plants will be used and additional equipment installed. The entire works will be used for electric battery manufacture.

The Board of Water Commissioners, Scarsdale, N. Y., will install three new centrifugal pumps, electrically operated, switchboard and other equipment at the municipal waterworks. Bids will be received until Feb. 27 for the machinery. The George A. Johnson Co., 150 Nassau Street, New York, are consulting engineers. George W. Field is clerk for the board.

William C. Hespe, Vienna, N. J., has acquired the local foundry of Daniel D. Wolfe, manufacturer of plows, castings, etc., and will remodel and improve the structure for the manufacture of stoves and ranges.

The U-Need Ice Co., Inc., 2150 Amsterdam Avenue, New York, has completed plans and will take bids for a two-story ice-manufacturing plant at Mt. Eden and Inwood Avenue, estimated to cost about $75,000. Koch & Wagner, 32 Court Street, Brooklyn, are architects.

The Parklap Construction Corporation, 84 Pine Street, New York, is planning for a new hydroelectric power plant at Diamond Creek, Ariz., estimated to cost about $10,000,000, including transmission system and dam, 400 ft. high. It will

have an initial capacity of 150,000 hp. Parsons, Klapp, Brinckerhoff & Douglas, 84 Pine Street, New York, are engineers.

A vocational department will be installed in the three-story high school to be erected by the Board of Education, Jersey City, N. J., at Bergen and Bostwick avenues, estimated to cost $800,000. Plans have been completed by John T. Rowland, Jr., architect, 100 Sip Avenue.

The Tidewater Oil Co., Constable Hook, Bayonne, N. J., will make additions in the tankage department at its refinery, including steel tanks, piping, etc., estimated to cost approximately $275,000.

The Lock Joint Rifle Co., Cornelia Street and Albert Avenue, Newark, has filed plans for a number of shop buildings, including power house.

The County Board of School Estimate, Newark, has voted in favor of a bond issue of $500,000 for the proposed vocational school at Bloomfield, N. J., and the proposition has been referred to the Board of Freeholders for approval. Preliminary plans for the school have been prepared by Guilbert & Betelle, 546 Broad Street, architects.

Anton Franz Mortel, Nurnberg, Germany, desires to get in touch with American manufacturers of machinery for making chalk in conical and square shapes for writing purposes.

The power house and other buildings at the plant of the Coirin Chemical Works, River Road, East Paterson, N. J., were destroyed by fire, Jan. 27, with loss estimated at about $150,000, including equipment. Frederick Coirin is head.

Philadelphia

PHILADELPHIA, Feb. 20.

The Girard Cycle Stores, 1022 West Girard Avenue, Philadelphia, will take bids at once for a new two-story service and repair works, 50 x 66 ft., at Hutchinson and Thompson streets, estimated to cost about $32,000. I. W. Levin, 1011 Chestnut Street, is architect.

Fire, Feb. 13, destroyed the main portion of the plant of the Ritter Can & Specialty Co., 1517-45 North Hutchinson Street, Philadelphia, manufacturer of cans, metal signs, etc., with loss estimated at about $400,000, including equipment. William H. Ritter is president.

Freight-handling machinery, loading and unloading equipment, etc., will be installed by the Department of Wharves, Philadelphia, on the new piers at Wolf and Porter streets. Each of the piers will be 300 x 900 ft., and will cost in excess of $2,000,000. Work has been commenced.

The Board of Trustees, Presbyterian Hospital, Thirty-ninth and Filbert streets, Philadelphia, will build a power house in connection with the new group of buildings to be erected at Saunders and Powelton avenues, estimated to cost about $3,000,000, complete. Dr. H. G. Paul is president of the board.

A new one-story power house will be erected at the plant of the Bloch Go-Cart Co., 1136 North American Street. W. E. S. Dyer, Land Title Building, is engineer.

The United States Shipping Board Emergency Fleet Corporation, Bristol, Pa., has placed the local plant of the Merchants' Shipbuilding Corporation on the market, and all buildings, plant machinery, etc., will be sold within the next few months. The equipment to be disposed of includes 18 15-ton tower cranes, 9, 10 and 15-ton gantry cranes, and one 15-ton portal pier crane; also, power house complete, with turbo-generators, boilers, pumps, etc., and machine and tool shop equipment.

Martin H. Walrath, Philadelphia, operating a general millwork factory at Park and Glenwood streets, has taken bids for a new plant, including power house, at Sixteenth and Indiana streets. Eugene A. Stopper, 1507 Arch Street, is architect and engineer.

The Pierce, Butler & Pierce Mfg. Corporation, Broad and Race streets, Philadelphia, manufacturer of boilers and radiators, with plant at Syracuse, N. Y., has leased a portion of the two-story building to be erected at Oxford and Thirtieth streets by the Nelson Bedley Construction Co. for a local branch.

Fire, Feb. 14, destroyed a portion of the plant of the Berry Engineering Co., 610-28 Crosby Street, Chester, Pa., manufacturer of machinery and parts, with loss estimated at close to $100,000.

The Standard Tank & Seat Co., 316 North Front Street, Camden, N. J., has awarded contract to Barclay, White & Co., 1713 Sansom Street, Philadelphia, for a new three-story plant, 32 x 78 ft., to cost close to $30,000.

Sydney L. Wright, president New Jersey & Pennsylvania Traction Co., West Hanover Street, Trenton, N. J., and other officials of the company are organizing a company under the name of the Plumstead Township-Bucks County Electric Co., to operate a power plant and furnish light and power service at Point Pleasant, Pa., and vicinity. Active operations will begin at an early date.

Arnold Orr, Slatington, Pa., formerly operating a machine and welding repair works at Plymouth, Pa., has acquired the Morgan property on McDowell Street, for the establishment of a similar plant. The building will be remodeled.

The Consumers' Auto Supply Co., 375 Bennett Street, Luzerne, Pa., has filed plans for a new one-story automobile service and repair building, 70 x 130 ft., on Main Street, estimated to cost about $50,000. James Corgan is president.

The Board of Directors, Montgomery School, Wynnewood, Pa., has acquired the Hooper Estate property, totaling about 56 acres of land, as a site for a new school. An adjoining structure will be used for vocational work, to include machine and repair shop, electrical and other departments. Plans will be prepared at once by Arthur H. Brockie, 254 South Fifteenth Street, Philadelphia. Percy H. Clark is president of the school board.

The Superintendent of Public Grounds and Buildings, Capitol Building, Harrisburg, Pa., will receive bids until Mar. 14, for the installation of equipment at the power house for the new state highway garage building, Twelfth and State streets, comprising two 80-hp. return tubular boilers, with steel breechings and stack, vacuum pumps, blowers and auxiliary equipment. T. W. Templeton is superintendent.

The Harrisburg Taxicab Co., Harrisburg, Pa., will make extensions and improvements in its garage and repair works to double the present capacity, providing facilities for about 75 cars.

The Westmoreland Hospital, Greensburg, Pa., will build a new power house in connection with an addition to the institution. Edward L. Tilton, 141 East Forty-fifth Street, New York, is architect.

The coal reclaiming plant of the Milton Mfg. Co., Milton, Pa., manufacturer of nuts, etc., near Snydertown, Pa., was partially destroyed by fire, Feb. 11, with loss estimated at about $17,000. It will be rebuilt.

The Pennsylvania Power & Light Co., 802 Hamilton Street, Allentown, Pa., has arranged for a large increase in capital, the proceeds to be used for extensions and improvements to power plants and system. The company is operated by the Electric Bond & Share Co., 71 Broadway, New York.

The Short Mountain Colliery Co., Lykens, Pa., has perfected plans for the immediate reconstruction of its pulverizing plant. New equipment will be installed. The McClintic-Marshall Co., Pottstown, Pa., has the construction contract.

A vocational department will be installed in the new three-story high school to be erected at Pottstown, Pa., J. H. Carey, secretary. Ritter & Shay, North American Building, Philadelphia, architects, have been commissioned to prepare plans.

The Triumph Motor Truck Co., Medina, N. Y., has completed plans for a new plant on property recently acquired at DuBois, Pa., and will commence work at an early date. Charles A. Meikle is president.

Vocational departments will be installed in connection with the three new junior high schools and one combination junior-senior high school to be erected by the Board of Education, Philadelphia. The structures are estimated to cost about $3,225,000. Bids for two will be received in March, and for the other two at some time prior to June.

The Lansdale Foundry Co., Lansdale, Pa., manufacturer of gray iron castings, has added numerous improvements to its plant in the last four months and is again manufacturing a full line of calorific steam and hot water heaters.

The Inter-State Safety Appliance Co., Beech and Noble streets, Norristown, Pa., which was recently organized, will engage in manufacturing and jobbing of all kinds of safety devices. It will soon be in the market for foundry equipment, wood-working and stamping machinery.

George Shearmann, Atlantic City, N. J., care of Haining & Pallister, Guarantee Trust Building, architects, will soon take bids for a one-story machine shop at Pennsylvania and Adriatic avenues, 36 x 70 ft.

Baltimore

BALTIMORE, Feb. 20.

The Continental Garage & Service Corporation, 715 Gaither Building, Baltimore, has awarded contract to the Consolidated Engineering Co., Calvert Building, for a five-story service, repair and parts manufacturing plant, estimated to cost about $250,000, including equipment. A complete machine shop will be installed. John C. Tolson heads the company.

The Bureau of Supplies and Accounts, Navy Department, Washington, will receive bids until March 7, for lathes, drills, grinders and other machine tools for use at the Norfolk, Va., navy yard.

The Central of Georgia Railway, Savannah, Ga., is having plans prepared for a new coaling plant at Columbus, Ga. C. K. Lawrence is chief engineer.

Freight handling and conveying machinery, hoisting equipment, etc., will be installed on the new piers to be constructed by the Port Development Commission, Baltimore. A fund of $10,000,000 has been arranged for the entire project, and the initial expenditure will approximate $2,000,000.

The American Belting Co., Baltimore, has acquired property at 1624-26 Bank Street, and will remodel the buildings for a new plant. M. C. Rasin is president.

A vocational department will be installed in the new two-story and basement high school to be erected at Leesburg, Va., bids for which are being taken until March 8. G. R. Ragan, Terry Building, Roanoke, Va., is architect.

The Southern Toy Co., Hickory, N. C., will take bids at once for a new plant at West Hickory, comprising three buildings, 40 x 100 ft., 40 x 50 ft., and 20 x 50 ft., respectively. A list of equipment is being arranged. G. F. Ivey is president.

A vocational department will be installed in the new two-story and basement high school to be erected at Reidsville, N. C., estimated to cost about $300,000. W. C. Northup, Winston-Salem, N. C., architect, will prepare plans.

The Dublin Veneer Mill, Dublin, Ga., is planning for the installation of new machinery to increase its capacity about 50 per cent. T. C. Alexander is head.

The Town Council, Dillon, S. C., is planning for extensions and improvements in the municipal electric light and power plant.

A vocational department will be installed in the new two-story and basement high school, 165 x 265 ft., to be erected at Gastonia, N. C., estimated to cost about $300,000. White, Streeter & Chamberlain, Gastonia, are architects.

Chicago

CHICAGO, Feb. 20.

The local market is spotty, some dealers reporting practically no new business, while other houses have booked a number of fair sized orders. One local dealer was awarded most of the machine tools on a list just purchased by the Hammond, Ind., Board of Education. This inquiry was published in this column last week and the purchases just made amount to about $15,000. Another order was placed locally by the Kelly Valve Co., Muskegon, Mich., which bought four No. 2 turret lathes and miscellaneous equipment. On the whole, current orders are for single machines and competition is exceedingly keen on each inquiry that appears. Purchases by industries are confined to the addition of a machine or two to round out present equipment. Large industries which have been important buyers in past years are notably absent from the market. The trade is encouraged, however, by the fact that the local tractor works of the International Harvester Co. started up with 1200 men last week after a long period of idleness. The Milwaukee tractor plant of that company is also expected to resume operations in the near future. No new railroad inquiries have appeared and action on the extensive lists pending has not been taken. New construction is confined largely to garages for which some equipment is being bought from time to time. No auction sales have been held recently, but the equipment of the Obenberger Drop Forge Co., Milwaukee, is to be sold soon to satisfy the claims of the creditors. This consists largely of forging equipment.

The price situation remains substantially the same, the only changes being a reduction on hack saws by the Racine Tool & Machine Co., averaging 15 per cent and a 25 per cent cut on turret lathes by the Warner & Swasey Co.

The crane market remains quiet, the only order reported being a 3½-ton motor-driven traveling overehead Shaw crane bought by the Tuthill Building Materials Co., Blue Island, Ill.

The Damascus Steel Products Corporation, 1509 Fourteenth Ave., Rockford, Ill., recently incorporated with $50,000 capital stock to manufacture cutlery and small tools, has leased 6000 sq. ft. of floor space for manufacturing purposes and has purchased the following equipment to date: Three trip hammers, six grinding and polishing stands, one shaper, one engine lathe, two forges and three gas furnaces. The officers include C. F. Maitland, president; J. R. Hughes and A. T. Hayes, vice-presidents; C. P. Twomey, secretary, Jacob Aaron, treasurer, and H. M. Hanson, assistant treasurer.

The Cabirange Mfg. Co., has increased its capital stock from $250,000 to $750,000 and will remove its plant from Taylorville, Ill. to Granite City, where a site has been acquired and buildings are now being erected at a cost of $125,000. In addition to assembling ranges the company will make and prepare all parts in its new plant, which will include a foundry and an enameling department.

Ronneberg, Pierce & Hauber, architects, 10 South La Salle Street, Chicago, are receiving bids on a machine shop, 75 x 96 ft., at 2704-10 West Lake Street, for J. Nielsen, to cost $20,000.

The Briskin Mfg. Co., sheet metal manufacturer, 215 South Hoyne Avenue, Chicago, has let contract for a two-story factory, 50 x 127 ft., to cost $40,000.

Ignatz Engel, 3056 Palmer Square, Chicago, is taking bids on a garage, 100 x 125 ft., at Milwaukee Avenue, near Crawford Avenue, to cost $45,000.

E. T. Davis, 133 West Washington Street, Chicago, is taking bids on a one-story garage, 50 x 100 ft., at Wilmette, Ill., to cost $20,000.

The Hudson Motor Co. of Illinois is taking bids through Alfred S. Alschuler, Chicago, on a three-story salesroom and service building, 100 x 300 ft., fronting on Michigan Avenue and extending back to Wabash Avenue, adjoining the Marmon building.

B. O. McDonald is equipping a machine shop in the west room of the Hancock Implement Co. building, Tekamah, Neb., and will be prepared to do all kinds of automobile repair work.

Bids have been taken on a power plant for St. Joseph's College, Rensselaer, Ind. It will contain boiler room, machine shop, engine room, pump room, etc., and will be two stories, the first, 73 x 140 ft., and the second, 32 x 72 ft.

The Lake City Utility Co., Lake City, Iowa, has been incorporated with $40,000 capital stock to construct a light and power plant. H. D. Yetter is president.

The F. P. Smith Wire & Iron Works, 2346 Clybourn Avenue, Chicago, will break ground at once for the erection of a three-story, rear addition, 25 x 40 ft.

In connection with an appropriation of $4,035,000 for the purchase of new rolling stock, improvements, etc., the Pere Marquette Railroad Co., South Wells and West Harrison streets, Chicago, will build a number of car and locomotive shops, estimated to cost aproximately $500,000, including equipment.

The Denver Gas & Electric Light Co., Denver, Colo., has arranged for a bond issue of $3,000,000, a portion of the proceeds to be used for power plant extensions and improvements.

The Chicago, Burlington & Quincy Railroad Co., 547 West Jackson Boulevard, Chicago, has plans under way for the erection of a new electric power house at Broadway and Clark streets, Aurora, Ill., estimated to cost about $100,000. William T. Krausch, 547 West Jackson Boulevard, is architect.

A vocational department will be installed in the new high school to be erected at Waseca, Minn., and for which William B. Ittner, architect, Board of Education Building, St. Louis, Mo., will prepare plans.

The Speeder Machinery Co., Fairfield, Iowa, is considering preliminary plans for the erection of a new factory.

The Illinois Traction Co., Champaign, Ill., is planning the erection of a new power plant at Decatur, Ill., estimated to cost about $100,000, including equipment.

A new one-story power house will be erected by the Roth Packing Co., Waterloo, Iowa. The installation will comprise two 500-hp. boiler and auxiliary operating machinery.

A vocational department will be installed in the new two-story high school to be erected at Clear Lake, Iowa, estimated to cost about $150,000. G. L. Lockhart, 1353 University Avenue, St. Paul, Minn., is architect.

New England

BOSTON, Feb. 20.

It is the consensus of opinion among local dealers that machine-tool sales in this district the past week were smaller than for any previous seven-day period this year. At the same time evidence suggesting better business later is noted. The General Electric Co., West Lynn, Mass., has not, as was anticipated, closed on its list of 42 machine tools for special production work, nor on its list of other equipment, and the Maine Central Railroad failed to take expected action on the three large machines wanted. A Massachusetts textile interest came into the market the past week with a list of 10 miscellaneous tools. These and other inquiries bring the aggregate number under consideration by local dealers up to more than 100. It does not, however, include several inquiries for used machinery, developed this week, as prospective buyers' ideas of prices are too low to be taken seriously, but it does include a considerable number of used tools under negotiation.

Several New England cities contemplate the purchase of machine shop equipment, but only a few have begun to make up lists. The report that Lowell and Quincy, Mass., are inquiring for equipment, according to information obtainable

here, is incorrect. Both cities intend at some future date to buy, but lists have not been completed.

Local machine-tool dealers take a hopeful view of the future. Machine shops throughout New England are showing more signs of life, but are still far from active. Some of the largest industrial plants also are growing busier, which leads machinery dealers to believe equipment will be purchased sooner or later, especially by those having tools under consideration. A Westboro, Mass., machine tool builder has secured a contract for 15,000 large carburetors. Operations at other plants show little, if any, expansion. Makers of road machinery are beginning to secure some substantial orders.

Sales the past week include part of a list recently issued by the H. B. Smith Co., Westfield, Mass., heaters and radiators, and involve fairly heavy production equipment by a Worcester machine-tool builder, and a Boston representative of a builder closed on some half-dozen machines, subject to shipping instructions to be issued later. The Eastern Nail Co., Providence, bought a 16-in. used shaper, and a Brockton, Mass., manufacturer a similar tool. A local sheet metal concern closed on four power squaring shears, a Providence firm on a 15-in. x 6-ft. lathe, a Maine garage on two 9-in. x 4-ft. lathes, a Weirs, N. H., garage on a one-spindle drill, all new tools, and perhaps a half-dozen other miscellaneous small tools have changed hands, most of them costing less than $100 each.

In connection with greater activity among machine shops, larger sales of hand hoists are noted, business in such lines being more active than in months.

The Phillips Mfg. Co., overhead trolley equipment, will locate in Easthampton, Mass. It recently purchased three heavy shears and punches.

The property and equipment of the Winnisimmet Ship Yard, Inc., Chelsea, Mass., will be sold at public auction by J. E. Conant & Co., Lowell, Mass., on March 1, 2 and 3.

The Eastern Malleable Foundry Co., Naugatuck, Conn., is considering the erection of a one-story foundry, 50 x 250 ft., at Watervliet, N. Y.

Plans are being drawn for the Dennison Mfg. Co., Framingham, Mass., paper novelties, etc., for a four-story factory, 70 x 300 ft., in Southboro, Mass.

The Boston Elevated Railway Co. is having plans drawn for a one-story, 50 x 500 ft. shop to be erected at its Forest Hill station. Edward Dana, 108 Massachusetts Avenue, Boston, is general manager.

The Thompson-Copeland Co., Vine Street, Worcester, Mass., lock washers, steel cotters and screw machinery, has purchased the assets, including machinery, of the Worcester Nut Co., which will be removed to Vine Street.

The Victor Page Motors Corporation, New York City and Farmingdale, L. I., automobiles, will erect a manufacturing plant at Stamford, Conn.

The Bureau of Yards and Docks, Navy Department, Washington, has had plans prepared for new coal-handling equipment to be installed at the Boston Navy Yard, and will call for bids at an early date. The work will be handled under specification 4583.

Superstructure erection of the new power house of the Cambridge Electric Light Co., 46 Blackstone Street, Cambridge, Mass., will be commenced at an early date. It will be 80 x 180 ft. and 40½ ft. high.

A vocational department will be installed in the new four-story high school, 145 x 180 ft., to be erected at Danbury, Conn., estimated to cost about $150,000. Sunderland & Watson, Main Street, are architects.

A one-story power plant, 50 x 60 ft., will be erected by the Mason & Hamlin Co., 492 Boylston Street, Boston, in connection with its new piano factory at Broadway and Third streets, Cambridge, Mass. Monks & Johnson, 99 Chauncey Street, Boston, are engineers.

A vocational department will be installed in the new three-story high school to be erected on Greenfield Street, Hartford, Conn., estimated to cost close to $1,500,000. Bids will be asked at an early date. The F. I. Cooper Corporation, 33 Cornhill Street, Boston, is architect. W. H. Scoville is chairman of the school board.

The E. Howard Clock Co., Eustis Street, Roxbury, Mass., has purchased the three-story factory, 60 x 200 ft., of the Peabody Leather Co., Peabody, Mass., with power plant, and will remove its works to this location. Employment will be given to about 300.

The Amesbury Body Co., Amesbury, Mass., manufacturer of automobile bodies, has acquired a brick factory at Clark's pond, Amesbury, where it will remove its present works. New equipment will be installed.

The Director of State Institutions, Middlebury, Vt., has had plans prepared and will soon take bids for a one and two-story automobile service and repair building, 55 x 240 ft., at the State School for Feeble Minded, Brandon, Vt., estimated to cost about $75,000. Lyman Austin, 240 College Street, Burlington, Vt., is architect.

Pittsburgh

PITTSBURGH, Feb. [illegible]

Business in machinery and tools is moderate in the extreme. Some of the small shops in this district are occasional buyers, but demands from the larger units are few and far between. A few fair-sized inquiries are before the trade. Some of the foundries which bid on the segments for the New York and New Jersey vehicular tunnel have made tentative inquiries for tools, but ordering them is contingent on their getting some of the segment business. The Sewell Valley Railroad, Rainelle, W. Va., has revived an old list and again is asking bids on a 36-in. planer, a 250-ton wheel press, a 1200-ton steam drop hammer and a universal milling machine. Little is going on in the crane market, but something should develop in the next few weeks in view of the many inquiries recently received. Steel mill equipment manufacturers note a better inquiry, and while current orders are few the impression prevails that better business is not far off. Expenditures of a considerable sum for new equipment in one of the Pittsburgh district units of the Steel Corporation is under consideration. This work was originally projected four or five years ago and now seems in a fair way of going ahead. The Allis-Chalmers Mfg. Co. recently took an order for three 24,000-bbl. oil pumps for the Gulf Refining Co. for installation at Port Arthur, Tex.

The Westinghouse Electric & Mfg. Co. reports a marked increase in the sale of large power apparatus this year. January sales reached a total value of $1,500,000 in turbine generators and condensers. Some of the buyers were the Pennsylvania Edison Co., Easton, Pa.; Madison Gas & Electric Co., Madison, Wis., and the North Carolina Light & Power Co. Most of the business was included in ten units. Takata & Co., Japan, have ordered another large turbine generator for one of its new plants. Fifty steam auxiliary units were sold during the month for a wide range of application, many purchasers being industrial power plants.

J. C. Forster & Son, 2519 Penn Avenue, Pittsburgh, manufacturers of stamped ware, tin products, etc., have awarded contract to R. E. Murray, 310 Iron Exchange Building, for a new two-story and basement plant, 50 x 100 ft., estimated to cost about $25,000. J. L. Forster is head.

Fire, Feb. 16, destroyed a portion of the plant of the Enterprise Foundry Co., Manhattan and Nixon streets, Northside, Pittsburgh, manufacturer of iron and steel castings, with loss estimated at about $50,000, including equipment.

The Butler Buick Co., Main Street, Butler, Pa., is completing plans for a new three-story automobile service and repair building, 85 x 110 ft., estimated to cost about $150,000. The Hunting-Davis Co., Century Building, Pittsburgh, is architect.

The Citizens' Light & Power Co., Oil City, Pa., has arranged for a bond issue of $43,000, for extensions and improvements in power plant and system.

Scobie & Parker, Pittsburgh, agricultural machinery, have leased the eight-story building, 30 x 120 ft., at 427 Liberty Avenue, for a five-year period, for its local works and headquarters.

The Negley Avenue Garage Co., Pittsburgh, has filed plans for a one-story service and repair building at South Negley Avenue and the Pennsylvania Railroad, estimated to cost about $50,000.

The H. C. Frick Coke Co., Pittsburgh, is planning for the erection of a new coal tipple at its mines at Whitney, Pa. Work to commence early in the spring.

The Westinghouse Electric & Mfg. Co., East Pittsburgh, has rejected all bids for its four-story addition, 100 x 200 ft., and will call for new bids later. Bernard H. Prack, Keystone Building, Pittsburgh, is architect. The company has acquired about 1220 acres of coal properties in Stowe and West Deer Townships from the Monarch Fuel Co., for a consideration of $733,000, and plans for extensive developments and operations on the land.

Fire, Feb. 12, destroyed the plant of the Blystone Mfg. Co., Cambridge Springs, Pa., manufacturer of machinery and parts, with loss estimated at about $100,000, including equipment.

The Gilbert Water & Light Co., Gilbert, W. Va., recently organized, is planning for the erection of a local power house. J. A. Berry is treasurer and general manager.

The Mountain State Motor Car Co., McFarland Street, Charleston, W. Va., has preliminary plans under way for a new two-story service and repair works, estimated to cost about $100,000, including equipment. A. D. Ellison is president.

A vocational department will be installed in the new high school to be erected by the East River District Board of Education, Princeton, W. Va., estimated to cost about $130,000. Bids will be taken up to March 18. Wysong & Jones, Princeton, are architects.

The Bluefield Ice & Cold Storage Co., Bluefield, W. Va.,

will commence the immediate erection of a new ice-manufacturing plant at Bluefield Avenue and Poplar Street, estimated to cost about $60,000.

The County Road Department, Clarksburg, W. Va., S. L. Cole, County Road Engineer, will build a one-story automobile service and repair shop for county cars.

Milwaukee

MILWAUKEE, Feb. 20.

Machine-tool inquiry is becoming more active and sales more frequent, but the call is limited to one or two tools. Indications are that more business will open up before long and some foundries have received orders that justified taking on more men. The motor parts and accessory group is overcoming a temporary slowing up, although it is yet too early for automobile producers to know what to bank on in the spring selling season. The manufacture of trucks is making slow progress. That the outlook is growing more promising is indicated by the establishment of a number of new concerns in the metal-working industry.

The American Brass Co., since Feb. 1 under the ownership of the Anaconda Copper Co., has made public tentative plans for a considerable extension of production at the Western branch works in Kenosha, Wis. George H. Allen, formerly general manager at Kenosha, and now a vice-president of the company, spent the week in Kenosha to survey the works. It is planned to establish a new mill for drawing fine copper wire. This involves no new construction, as the mill will be installed in the former plant of the Kenosha Refrigerator Co., which was acquired by the American Brass Co. in 1916.

The Richards Iron Works, Manitowoc, Wis., has been converted into a corporation without change of name. The capital stock is $125,000 and the incorporators are Henry and Reuben Richards and John W. Barnes. It does a general foundry and machine shop business and also is a fabricator of rolled steel products.

Cahill & Douglas, consulting engineers, 217 West Water Street, Milwaukee, are engaged in surveys contemplating the electrification of the power plant and factory drive of the Interior Woodwork Co., 521-529 Park Street, Milwaukee, and additional power plant and boiler house facilities for the Rhinelander Paper Co., Rhinelander, Wis.

The H. & D. Mfg. Co., Racine, Wis., has been incorporated with a capital stock of $25,000, and will establish a plant for the production of pistons, piston rings and similar gas engine and automotive parts, accessories and specialties. The incorporators are Martin Horeth, William C. Draeger, Joseph F. Dodd, Walter R. Draeger and Charles Jenista, all of Racine.

Harry W. Bolens, president and general manager Gilson Mfg. Co., Port Washington, Wis., has purchased at public auction the plant, equipment and other property of the defunct Globe Metal Products Co., Sheboygan, Wis., for $65,700. It consists of a gray iron foundry and machine shop. The Gilson company manufactures gas engines, implements, and farm tools and also does a large jobbing business in chair and furniture castings. Mr. Bolens expects to make a statement later relative to the use to which the former Globe works are to be put, and intimated that the production of a new type of power hoe and lawn mower tractor, recently developed at Port Washington, may be transferred to the newly acquired works.

The Wisconsin Electric Appliance Co., Menasha, Wis., has been organized with a capital stock of $75,000 by Victor M. Gombert, G. E. Lewis and H. E. Ballard, all of Menasha. It will establish a factory for the manufacture of a general line of electric appliances and devices, but the incorporators are not ready to make details public.

The Norman Motor Car Co., Hurley, Wis., has plans for a two-story public garage and machine shop, 50 x 155 ft., estimated to cost $30,000. Alvin J. Norman is president and manager.

The Milwaukee-Western Fuel Co., 120 Wisconsin Street, Milwaukee, sustained an estimated loss of $150,000 by the destruction by fire of the anthracite coal shed at Canal Street and Sixth Avenue on Feb. 13. The building was 175 x 400 ft., and contained hoisting machinery and other equipment which is a total loss. It will be rebuilt immediately and inquiry is now being made for new equipment. William F. Ardern is vice-president and general superintendent.

The Board of Education, Durand, Wis., will take bids after March 15 for a new high school and vocational training institute, to cost about $120,000. The architects are Oppenhamer & Obel, Wausau, Wis. H. H. Miles is secretary of the board.

The Borges-Baker Co., 551-563 Edison Street, Milwaukee, manufacturer of metal shears and similar metal-working devices, has incorporated with a capital stock of $10,000. The owners are William F. and Arthur F. Borges and Charles Baker, who also own and operate the W. R. Sherin Co., doing automotive repair work, repainting, trimming, body construction, etc. The two plants occupy the same buildings.

The Board of Education, Whitehall, Wis., has plans by Oppenhamer & Obel, architects, Wausau, Wis., for a new combination high and industrial training school, 72 x 150 ft., two stories and basement, estimated to cost $130,000, with school and shop equipment. A. D. Peterson, clerk of the board, will take bids about March 20.

The Tomah Iron Works, Tomah, Wis., which for some time past has conducted a public garage, machine and automotive repair shop in connection with its foundry and general machine shop business, has incorporated as the Tomah Iron Works Garage, Inc. The capital stock is $30,000. The owners are Robert S. Murray, Carl A. Sweet and Harry M. Warren.

The Stoughton, Wis., works of the Moline Plow Co., has resumed the operation of its gray iron foundry for a limited period to turn out a number of orders for parts for new material as well as replacement parts. According to George Ford, general manager at Stoughton, it is impossible to predict if conditions will permit the continuance of production after present specifications have been filled.

Cincinnati

CINCINNATI, Feb. 20.

Local manufacturers report a slight falling off in inquiries and orders the past week. There are, however, still a few inquiries of some size being worked on. Orders booked were confined almost exclusively to single machines and while the past week showed a slight decline the general situation continues to improve and manufacturers in this district are confident that the industry is definitely on the upturn. Makers report difficulty in closing on inquiries and much shopping is being done by prospective purchasers in the hope of receiving substantial reductions in price. Very little success is being met with, however, but used machines are coming on the market more freely at very low prices.

The Breese Brothers Co., Cincinnati, metal manufacturer, has placed contract with the Fisher-Devore Construction Co. for the concrete work for its new buiding on Hunt Street, to replace the one destroyed by fire in December. Zettel & Rapp, Mercantile Library Building, are the architects.

The National Protecto Pump Co., Dayton, Ohio, has purchased the plant formerly owned and occupied by the Dayton Metal Body Co., North Dayton, and will make alterations preparatory to moving its plant from its present location in West Dayton.

The Expression Player Piano Co., Columbus, Ohio, has purchased property near Dana Avenue and West Broad Street and is having plans prepared for a modern two-story factory, 48 x 240 ft. It will manufacture electric reproducing player piano actions. Charles E. Bard is president.

The Sterling Stove Co., Portsmouth, Ohio, has been incorporated with a capitalization of $100,000 to manufacture gas cooking and heating stoves, with plant at Tenth and Scott streets. Henry Scott and B. W. Houkins head the company.

The Jones Machine Tool Co., Cincinnati, is in the market for a used No. 23 New Britain automatic machine, 2-in. capacity, for brass work.

Detroit

DETROIT, Feb. 20.

The Hirsch Mfg. Co., Sturgis, Mich., manufacturer of metal products, will soon take bids for a three-story and basement addition, 130 x 200 ft., estimated to cost about $100,000. E. S. Batterson, 405 Hanselman Building, Kalamazoo, Mich., is architect. C. Hirsch is president.

A. O. LeGrande, Ferndale, Mich., operating a sheet metal works at 393 Woodland Avenue, is planning for the installation of additional equipment.

The Holley Carbureter Co., Vancouver Avenue, Detroit, manufacturer of carbureters and other ignition equipment, has awarded a contract to Culbertson & Kelly, 872 West Milwaukee Street, for the erection of a one and two-story plant addition at Vancouver and Military avenues.

The Consumers Power Co., Jackson, Mich., has plans nearing completion for a new two-story power house at Powers, Mich., estimated to cost about $400,000, including equipment. It will replace a generating station recently destroyed by fire.

A one-story power plant will be constructed by the Michigan Canned Food Co., 817 Book Building, Detroit, in connection with its proposed new factory at Greenville, Mich., estimated to cost about $150,000. The Industrial Construction Co., Eau Claire, Wis., is preparing plans.

A vocational department will be installed in the new high school to be erected by the board of education, Albion, Mich., estimated to cost about $150,000. R. A. LeRoy, 102 Pratt Building, Kalamazoo, Mich., is architect. Donald Harrington is superintendent of schools.

A vocational department will be installed in the new East junior high school to be erected at Lansing, Mich., estimated to cost about $150,000. J. N. Churchill, 514 Oakland Building, is architect. I. W. Cooper is secretary of the board.

The city of Battle Creek, Mich., will spend this year approximately $50,000 for new equipment at the Verona water pumping station. It will include air lift pumps and engines.

Buffalo

BUFFALO, Feb. 20.

The Buffalo Chemical Fire Extinguisher Co., 67 Carroll Street, Buffalo, manufacturer of fire extinguishers and general fire-fighting equipment, has acquired about two acres of land at Central Avenue and the Erie Railroad as a site for a new plant, 100 x 300 ft., with two-story office building. This will comprise the first unit and will give employment to about 125. A second unit of like size will be built later. George R. Stephens is president.

The Niagara Power Co., Buffalo, will expend about $11,000,000 for its new electric generating plant at Niagara Falls, N. Y., foundation and tunnel work for which has been commenced. A steel tower transmission line will be constructed to Buffalo. The plant will have an initial capacity of 200,000 hp.

A vocational department will be installed in the new high school to be erected at Medina, N. Y., estimated to cost about $425,000. H. W. Robbins is chairman of the board. Plans have been prepared.

Fire, Feb. 13, destroyed a portion of the plant of the New Conklin Wagon Co., 420 East State Street, Olean, N. Y., with loss estimated at about $300,000, including buildings and machinery. It is planned to rebuild.

Vocational departments will be installed in the two new junior high schools to be erected at Niagara Falls, N. Y., estimated to cost about $1,000,000. Bids will be asked immediately.

The Clipper Tool Co., Buffalo, N. Y., has reduced its prices on clamp vises and oval slide vises, saw sets and machinists' hammers.

The Central South

ST. LOUIS, Feb. 20.

J. M. Kurn, president St. Louis & San Francisco Railroad has announced that a 200-ton crane will be purchased for the company's main shops at Springfield, Mo., and that other equipment will be purchased at a total cost of $205,000. No lists have been issued by the purchasing department.

The Columbian Steel Tank Co., Kansas City, Mo., has acquired property adjoining its plant for proposed extensions. A. A. Kramer is head.

Fire, Feb. 8, destroyed the Dardanelle Machine Works plant, Dardanelle, Ark., with loss estimated at about $13,000.

The City Council, St. Joseph, Mo., has called a special election, April 11, to vote bonds for $300,000, for the construction of a municipal electric light and power plant.

J. M. Griffin, Laurel, Miss., and associates, have acquired about 25,000 acres of timber property in the vicinity of Hattiesburg, Miss., and plans the erection of a lumber mill, estimated to cost in excess of $150,000, including machinery. It will have a capacity of over 50,000 ft. per day.

The Common Council, Charleston, Ark., has granted permission to E. C. Linley, Charleston, for the erection of an electric light and power plant for local service. Plans will be prepared at once.

Fire, Feb. 11, destroyed a portion of the plant of the Kentucky Veneer Mills, Louisville, with loss estimated at about $75,000, including machinery.

W. B. Haarstick, Vandalia, Mo., and associates, are perfecting plans for the organization of a new company to construct and operate a plant at Jefferson City, Mo., for the manufacture of chains. It will be two stories and is estimated to cost about $75,000.

The Baldwin Garage Co., Columbus, Kan., has plans under way for the erection of a new one-story service and repair works, 120 x 150 ft., estimated to cost about $50,000.

A vocational department will be installed in the new three-story and basement junior high school, 110 x 124 ft., now being constructed by the Board of Education, El Reno, Okla., estimated to cost $215,000.

The F. G. Allin Construction Co., 1442 Syndicate Trust Building, St. Louis, is making inquiries for about [illegible] lb. of standard brass pipe, sizes ⅛ to 3 in.

The Crab Tree Corporation, Johnson City, Tenn., Frank R. Scott, president, is planning for the erection of a new grinding mill at its feldspar and mica properties in Mitchell County, N. C. A housing development for employees will also be built.

A vocational department will be installed in the new junior high school to be erected at Sapulpa, Okla., estimated to cost about $100,000. Plans will be prepared at an early date.

The Common Council, McCracken, Kan., will take bids early in March for a new power plant and equipment. The Ruckel Engineering Co., Hutchinson, Kan., is engineer. L. L. Ryan is city clerk.

D. C. Hale, Paducah, Ky., and associates, are organizing a company to construct and operate a crushing and grinding plant at properties in the vicinity of Bowling Green, Ky. About 1,000 acres has been acquired. The plant is estimated to cost about $75,000.

The Kot-N-Wood Products Co., Memphis, Tenn., will equip a portion of its new plant, now in course of erection, for the manufacture of disk wheels for automobiles. George B. Stryker is president.

Indiana

INDIANAPOLIS, Feb. 20.

The Haskell & Barker Car Co., Michigan City, Ind., has plans under way for a two-story addition to its shops to cost about $150,000. Howard Shaw, 39 South State Street, Chicago, is architect.

The plant of the Buckeye Mfg. Co., Anderson, Ind., manufacturer of engines, has been sold by Linfield Myers, receiver, to James W. Sansberry, Anderson, and associates, for a consideration of $45,100, including buildings and equipment. The property was appraised recently at $170,000.

A power plant will be constructed by the Board of Trustees, Indiana Village for Epileptics, Newcastle, Ind., in connection with new institutional buildings on a site near the city.

Motors and other electrical equipment, ovens, etc., will be installed in the new four-story baking plant to be erected by the Craig Biscuit Co., 115 Montgomery Street, Fort Wayne, Ind., estimated to cost about $150,000. The McCormick Co., Inc., 41 Park Row, New York, is architect and engineer.

A power plant will be installed in the new fifteen-story hotel to be erected by the Keenan Hotel Co., Fort Wayne, Ind., care of the Anthony Hotel, 128 West Berry Street, estimated to cost about $900,000. C. R. Weatherhogg, Citizens' Trust Building, is architect.

Freight-handling and conveying machinery will be installed in the new seven-story and basement terminal warehouse, 195 x 245 ft., to be erected at Pennsylvania and Georgia streets, Indianapolis, by the Terminal Building Corporation, Albert E. Metz, president, Fletcher Savings & Trust Building, estimated to cost about $250,000. Plans will be prepared at an early date.

R. O. Bright, president Arvac Mfg. Co., Anderson, Ind., announces the necessity of additional equipment owing to increased demand for its chief products, disk universal joints for automobiles. The manufacture of the company's original line, metal universal joints, will be continued.

The Gulf States

BIRMINGHAM, Feb. 20.

The Common Council, Altoona, Ala., is planning for the construction of a municipal electric light and power plant.

The Owens Boll Weevil Exterminator Co., Weatherford, Tex., is planning for the operation of a local plant to manufacture a special machine for boll weevil extermination in the cotton fields. J. P. Owens is president and general manager.

The Douglass Drilling Co., Rockdale, Tex., is completing plans for a new oil refinery with an initial daily output of about 50 bbl., to be increased later.

The Ocklawaha Reclamation Farms, Leesburg, Fla., is planning for the construction and operation of a new hydroelectric generating plant in the vicinity of Moss Bluff, Fla. J. D. Young, Leesburg, is engineer.

The Board of City Commissioners, Vernon, Tex., is having plans prepared for the construction of a municipal electric light and power plant. It is expected to call for bids in the near future.

The McDowell Ball Bearing Fishing Tool Co., Shreveport,

[illegible] recently organized with a capital of $250,000, is planning for the establishment of a local plant for the manufacture of oil well drilling and other tools. Wade E. Hampton is president and treasurer, and J. F. McDowell, secretary.

The Bedell Structural Steel Works, fabricator and erector, 3600 Boudin Street, New Orleans, is in the market for the following used equipment: Machine to shear ¾-in. plates, punch 1¼-in. holes, cut ¾ x 6 x 6-in. angles; compressor complete; drill press and screw cutter for machine bolts up to 1-in., also for threading pipe.

The Malone-Harrison Motor Co., Dothan, Ala., recently incorporated, has completed plans and will take bids at once for a new one-story service and repair building, 100 x 200 ft. J. V. Harrison, 118 North St. Andrews Street, is secretary and general manager.

The W. L. Lemly Foundry Co., Bessemer, Ala., manufacturer of cast iron pipe, is planning for enlargements in its local plant. It recently acquired the Columbus Foundry Co., Columbus, Ga.

James P. Owens, Weatherford, Tex., in co-operation with the Chamber of Commerce, Rockdale, Tex., is arranging for the erection of a new plant to manufacture special machinery to be used in connection with cotton plantation work.

The Mirando City Refining Co., Mirando City, Tex., has perfected plans for a new refinery to handle crude oil from the Laredo district.

The Miami-Cadillac Co., Miami, Fla., has awarded contract to P. J. Davis, Miami, for a one-story automobile service and repair works, 50 x 120 ft. J. E. Junkin is president.

The Switzer-Parke Co., 105 Paige Street, Houston, Tex., recently organized, has awarded contract to the H. H. Spiks Co., 1606 Bingham Street, for a new plant to manufacture electro-plated ware, enameled products, metal ware, etc. It will approximate about 11,000 sq. ft. of floor space, and the installation will include ovens, generators, motors, boilers and other equipment. Willard M. Parke is president, and Homer E. Switzer, secretary and treasurer.

The Ocklawa Farms & Reclamation Co., Ocala, Fla., has preliminary plans under way for the construction of a new hydroelectric generating plant on the Ocklawaha River.

The Texas & Pacific Railroad Co., Marshall, Tex., is completing the erection of a new three-story building on its local shop grounds, to be equipped for instruction and study in car and locomotive work for apprentices. Facilities will be provided for about 150 men and boys.

The Pacific Coast

SEATTLE, Feb. 14.

The Mineral Metal & Hyproducts Co., American National Bank Building, San Francisco, has plans under way for the first unit of its new works at San Mateo,, Cal., in property recently acquired, comprising about 1370 acres of tidelands.

The Power Implement Machine Works, Modesto, Cal., has acquired property on San Fernando Road, Glendale, Cal., 113 x 400 ft., as a site for a new plant to cost about $25,000. J. J. Ferlin is president.

The James Graham Mfg. Co., Newark, Cal., manufacturer of stoves, ranges, etc., is planning the erection of a new reinforced-concrete factory to cost about $50,000.

The City Council, Santa Ana, Cal., is planning for the installation of an electric power plant at the municipal waterworks, estimated to cost about $75,000. Bonds in this amount will be arranged at an early date.

The Santa Fe Railway Co., Kerckhoff Building, Los Angeles, has awarded a contract to A. C. Fellows, Central Building, for its one-story machine shop at San Bernardino, Cal., 65 x 510 ft., estimated to cost about $250,000, including machinery, cranes, etc.

The A. Meister Sons Co., Sacramento, Cal., manufacturer of automobile bodies, street car equipment, etc., is planning the erection of new works at Fresno, Cal., to cost about $150,000, including machinery.

M. Elsane, 130 Montgomery Street, San Francisco, Cal., has awarded a contract to MacDonald & Kahn, San Francisco, for a new one-story machine shop at Fourth and Washington streets, Alameda, Cal.

The Los Angeles Automotive Co., Los Angeles, has awarded a contract to the Moran Co., Los Angeles, for a new one-story plant, 50 x 250 ft., for assembling electrically-operated automobile trucks and for parts manufacture.

The Wasserman Water Heater Mfg. Co., Burton Street, Los Angeles, has filed plans for an addition, 40 x 65 ft.

The Industrial Mfg. Co., Lodi, Cal., recently organized with a capital of $200,000, to manufacture special turbine pumps, parts, etc., has selected a site for the erection of a new plant. Dean H. Thompson, president and general manager, is inventor of the pump.

The Kimball Motor Truck Co., 1265 American Avenue, Long Beach, Cal., will commence immediately erection of a plant at Spring Street and the line of the Pacific Electric Railway, Willowville section, to manufacture motor trucks. It will be one-story and approximate 24,000 sq. ft. of floor space. M. O. C. Hull is general manager.

The Northern Pacific Railway Co., Seattle, Wash., is considering the erection of new car and locomotive shops at South Tacoma, Wash., and extensions in local yard facilities, estimated to cost about $350,000.

Cleveland

CLEVELAND, Feb. 20.

Machine-tool dealers and manufacturers report a slight gain in orders and inquiries from week to week. Orders are almost wholly for single machines and come from widely scattered sources. The Otis Elevator Co., New York, has issued a list of nine machines for its Cleveland and Detroit plants, which is the only inquiry of any size that came out the past week. Manufacturers of automatic screw machines report an improvement in single tool orders and a better volume of inquiry. An order from Japan for a large turret lathe was placed with a Cleveland machine manufacturer during the week, which is the first Japanese order taken by this company in a year.

The Warner & Swasey Co., Cleveland, has announced a 25 per cent reduction on its line of turret lathes. This follows a 16 per cent cut made by the company last year.

The Otis Elevator Co. has issued the following list of machines, all motor driven, for its Cleveland and Detroit plants: One 14-in. geared head engine lathe; two 18-in. geared head engine lathes; one 24-in. geared head engine lathe; two ¾-in. single spindle high-speed drill presses; two double-end dry grinders and one cold cut-off saw.

Canada

TORONTO, Feb. 20.

During the past week a decided change for the better has appeared in the Canadian machine tool market. The automobile industry is the chief factor in the betterment of the demand and some dealers state that orders the past ten days have been much better than for any like period this year. In general, industrial activity throughout the Dominion has been making steady progress and both dealers and manufacturers are receiving orders from many unexpected sources. Municipalities which carried by-laws the first of the year for large expenditure on waterworks, sewage and electric plants are now making preparations to carry out these undertakings and are asking for information and ordering the required equipment. Renewed activity is reported in the mining fields of northern Ontario and dealers are receiving inquiries for equipment from this source. Improved manufacturing conditions is likewise having a good effect on the demand for small tools, practically all lines of which are moving in increased volume. Prices on machinery and small tools are showing a little more strength, and no announcement of any revision has been made during the week.

The Waterworks Commission, Brantford, Ont., is having plans prepared for an addition to the pumping station to cost $250,000, including the installation of three gage centrifugal pumps with electric motors.

The City Council of Goderich, Ont., plans improvement to the waterworks system, including the erection and equipment of a new pump house to cost about $50,000.

The town of Wiarton, Ont., plans the installation of electric pump and engine for the waterworks plant to cost $10,000.

The International Burr Co., Watertown, N. Y., is establishing a manufacturing plant at Belleville, Ont.

Plans for hydroelectric development in the Calumet channel of the Ottawa River at Bryson, Que., have been deposited by the Ottawa & Hull Power & Mfg. Co. with the Minister of Public Works at Ottawa, Ont., and the Land Registry Office at Quebec, Que., disclosing the fact that the company is considering future expansion of its power development.

The Acme Pattern & Tool Co., Buffalo, N. Y., has leased the Thorpe factory on Courtright Street, Bridgeburg, Ont., where it will establish a Canadian branch factory.

The city of St. Thomas, Ont., plans to install new transformers and equipment to cost $25,000. Mr. Miller is engineer.

The York Sandstone Brick Co., East Toronto, is asking for prices on a horizontal return tubular boiler, 72 x 18, 150-lb. pressure, drum and tubes only.

Current Metal Prices

On Small Lots, Delivered from Merchants' Stocks, New York City

The following quotations are made by New York City warehouses.

As there are many consumers whose requirements are not sufficiently heavy to warrant their placing orders with manufacturers for shipment in carload lots from mills, these prices are given for their convenience.

On a number of articles the base price only is given, it being impossible to name every size.

The wholesale prices at which large lots are sold by manufacturers for direct shipment from mills are given in the market reports appearing in a preceding part of THE IRON AGE under the general heading of "Iron and Steel Markets" and "Non-ferrous Metals."

Iron and Soft Steel Bars and Shapes

	Per Lb.
Bars:	
Refined bars, base price	2.53c.
Swedish bars, base price	10.00c.
Soft steel bars, base price	2.53c.
Hoops, base price	3.38c.
Bands, base price	3.13c.
Beams and channels, angles and tees 3 in. x ¼ in. and larger, base	2.63c.
Channels, angles and tees under 3 in. x ¼ in., base	2.53c.

Merchant Steel

	Per Lb.
Tire, 1½ x ½ in. and larger	2.50c.
(Smooth finish, 1 to 2½ x ¼ in. and larger)	2.70c.
Toe-calk, ½ x ⅝ in. and larger	3.20c.
Cold-rolled strip, soft and quarter hard	6.25c. to 7.25c.
Open-hearth spring steel	3.55c. to 6c.
Shafting and Screw Stock:	
Rounds	3.45c.
Squares, flats and hex	3.95c.
Standard cast steel, base price	12.00c.
Extra cast steel	17.00c.
Special cast steel	22.00c.

Tank Plates—Steel

¼ in. and heavier	2.63c.

Sheets

Blue Annealed

	Per Lb.
No. 10	3.28c. to 3.53c.
No. 12	3.33c. to 3.58c.
No. 14	3.38c. to 3.63c.
No. 16	3.48c. to 3.73c.

Box Annealed—Black

	Soft Steel C. R., One Pass Per Lb.	Blued Stove Pipe Sheet, Per Lb.
Nos. 18 to 20	3.55c. to 3.80c.	.....
Nos. 22 and 24	3.60c. to 3.85c.	4.10c.
No. 26	3.65c. to 3.90c.	4.15c.
No. 28	3.75c. to 4.00c.	4.25c.
No. 30	4.00c. to 4.25c.	.....

No. 28 and lighter, 36 in. wide, 10c. higher.

Galvanized

	Per Lb.
No. 14	3.85c. to 4.10c.
No. 16	4.00c. to 4.25c.
Nos. 18 and 20	4.15c. to 4.40c.
Nos. 22 and 24	4.30c. to 4.55c.
No. 26	4.45c. to 4.70c.
No. 27	4.60c. to 4.85c.
No. 28	4.75c. to 5.00c.
No. 30	5.25c. to 5.50c.

No. 28 and lighter, 36 in. wide, 20c. higher.

Welded Pipe

Standard Steel	Black	Galv.	*Wrought Iron*	Black	Galv.
½ in. Butt	—56	—40	¾-in. Butt	—30	—13
¾ in. Butt	—61	—47	1½-in. Butt	—32	—15
1-3 in. Butt	—63	—49	2-in. Lap	—27	—10
3½-6 in. Lap	—60	—46	2½-6-in. Lap	—30	—15
7-8 in. Lap	—56	—34	7-12-in. Lap	—23	— 7
9-12 in. Lap	—55	—33			

Steel Wire

BASED PRICE* ON NO. 9 GAGE AND COARSER	Per Lb.
Bright basic	3.50c. to 3.75c.
Annealed soft	3.50c. to 3.75c.
Galvanized annealed	4.25c. to 4.50c.
Coppered basic	4.00c. to 4.25c.
Tinned soft Bessemer	5.50c. to 5.75c.

*Regular extras for lighter gage.

Brass Sheet, Rod, Tube and Wire

BASE PRICE

High brass sheet	17¼c. to 17½c.
High brass wire	17¼c. to 17½c.
Brass rod	14¼c. to 14½c.
Brass tube, brazed	26 c. to 27½c.
Brass tube, seamless	18½c. to 19 c.
Copper tube, seamless	21¼c.

Copper Sheets

Sheet copper, hot rolled, 24 oz., 21c. to 21½c. per lb. base.

Cold rolled, 14 oz. and heavier, 2c. per lb. advance over hot rolled.

Tin Plates

Bright Tin		Coke—14-20		
			Primes	Wasters
Grade "AAA" Charcoal 14x20	Grade "A" Charcoal 14x20	80 lb.	$6.05	$5.80
		90 lb.	6.15	5.90
		100 lb.	6.25	6.00
IC	$10.00	$8.50	IC	6.40	6.15
IX	11.25	10.00	IX	7.40	7.15
IXX	13.00	11.50	IXX	8.40	8.15
IXXX	14.75	13.25	IXXX	9.40	9.15
IXXXX	16.25	15.00	IXXXX	10.40	10.15

Terne Plates

8-lb. Coating 14 x 20

100 lb.	$7.00
IC	7.25
IX	7.50
Fire door stock	10.00

Tin

Straits, pig	33c.
Bar	38c. to 43c.

Copper

Lake ingot	15 c.
Electrolytic	14¾c.
Casting	14½c.

Spelter and Sheet Zinc

Western spelter	6½c. to 7c.
Sheet zinc, No. 9 base, casks	10½c. open 11c.

Lead and Solder*

American pig lead	5¾c. to 6¼c.
Bar lead	6¾c. to 7 c.
Solder, ½ and ½ guaranteed	24c.
No. 1 solder	22c.
Refined solder	18c.

*Prices of solder indicated by private brand vary according to composition.

Babbitt Metal

Best grade, per lb.	75c.
Commercial grade, per lb	35c.
Grade D, per lb.	25c.

Antimony

Asiatic	6c. to 6¼c.

Aluminum

No. 1 aluminum (guaranteed over 99 per cent pure), in ingots for remelting, per lb.	26c. to 28c.

Old Metals

Prices are a little lower and business is difficult except at concessions. Dealers' buying prices are nominally as follows:

	Cents Per Lb.
Copper, heavy crucible	10.75
Copper, heavy wire	10.00
Copper, light and bottoms	8.00
Brass, heavy	5.25
Brass, light	4.50
Heavy machine composition	7.25
No. 1 yellow brass turnings	5.00
No. 1 red brass or composition turnings	7.00
Lead, heavy	3.75
Lead, tea	2.50
Zinc	2.50